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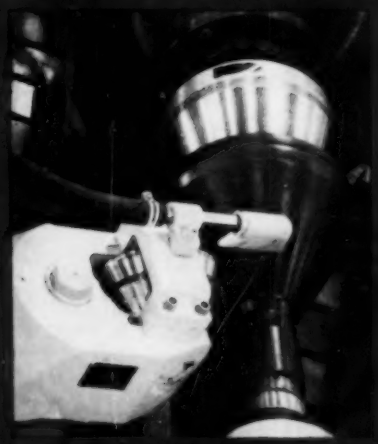
JULY 1955

McGRAW-HILL DIGEST

INTERNATIONAL BUSINESS AND INDUSTRY



SILICONE'S imposing list of uses excites the imagination. But expansion overseas, for the time being, is likely to be slow and costly p11

MERIT-RATING PLANS can cause friction with employees. Here's one that they will approve p14

CERTAIN STANDARDS improve any manager's job performance. They challenge your executive ability p16

POWER SPINNING on a newly developed machine holds much promise for the production man. Hollow cones are formed at a 75% saving in cost . . p22

TREND in U.S. railroads is toward better passenger service. New cars highlight this trend p33

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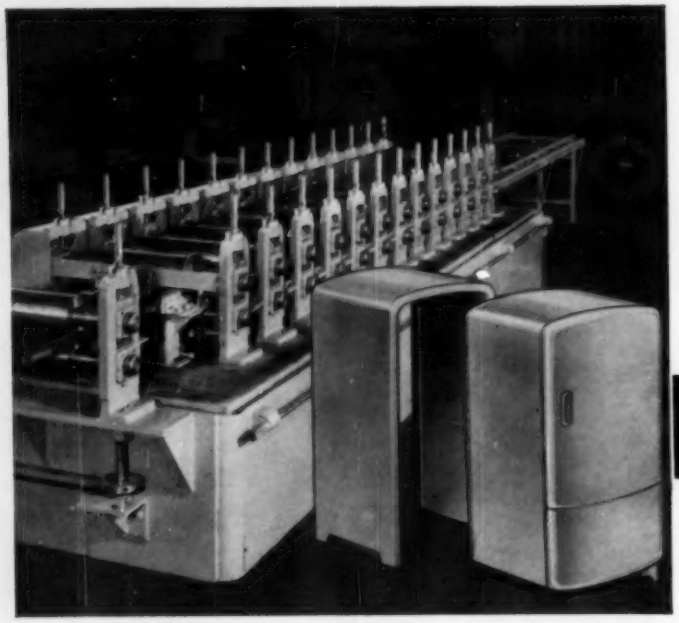

Refrigerator shells now being made almost exclusively in Yoder Cold Roll Forming machines, from flat sheets forming sides and top.

In autos, buses and railroad coaches, cold roll formed mouldings and panels serve many purposes, both inside and out.

Cold Roll Formed components enter extensively into this Stranssteel house and many other factory-built structures.

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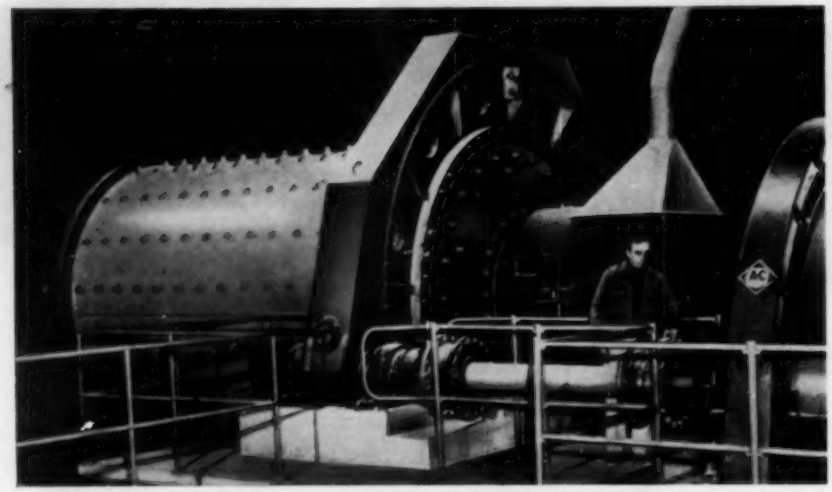

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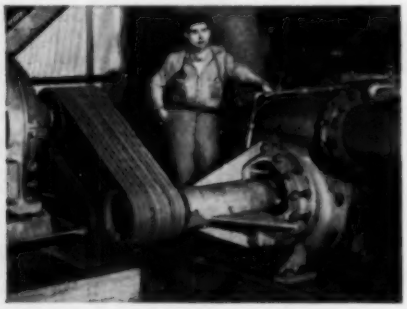

PUMPS. This is an Allis-Chalmers pump designed to handle liquids and slurries containing large volumes of solid materials. They offer exceptionally long wear and simple maintenance. There are many other designs, to meet other pumping problems.

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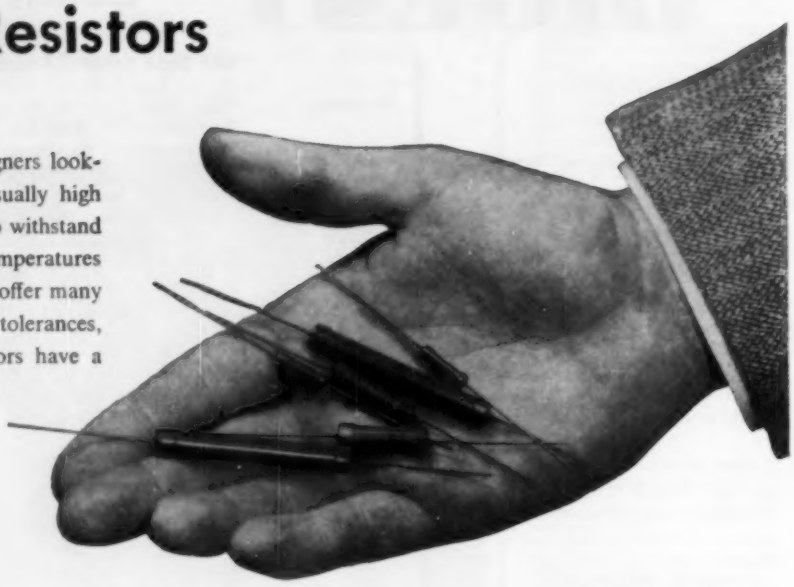

Corning Type S Resistors give you:

Excellent high temperature characteristics—These resistors will operate at ambient temperatures up to 200°C.—have an unusually low temperature coefficient of resistance.

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Superior high frequency characteristics—The thin film insures inherent stability and provides excellent high frequency characteristics.

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Power Rating	SIZE *Length*	*Diameter*	RESISTANCE *Min. (ohms)*	*Max. (ohms)*
1 Watt	19/32"	11/64"	10	10,000
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Rugged construction—The new film material makes integral contact with the heat-resistant base to form a tough bond. Fired-in silver bands afford low resistance, low noise termination.

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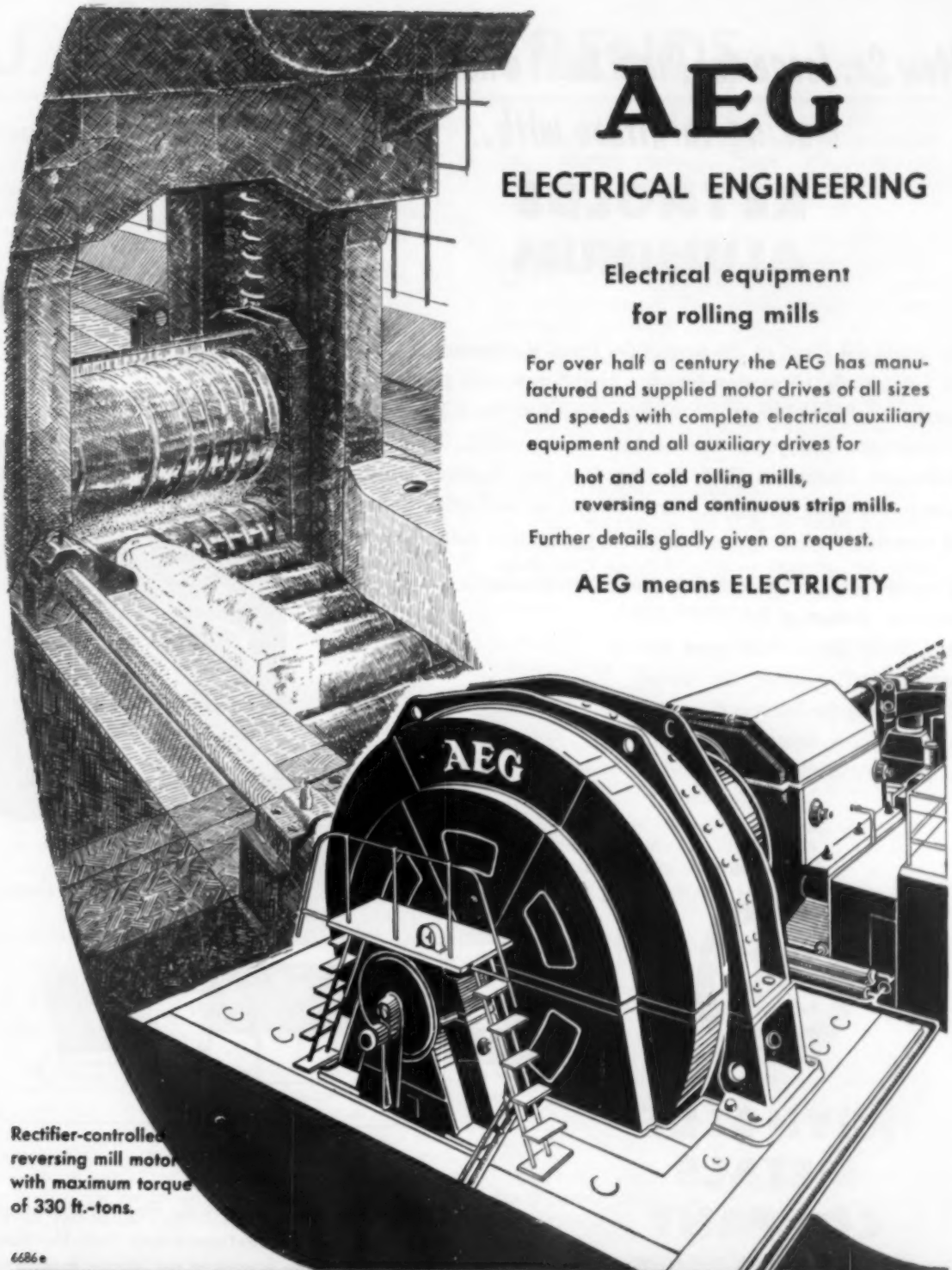

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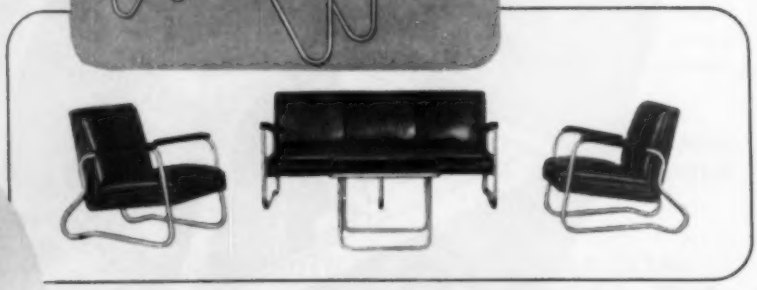

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U. S. BUSINESS TRENDS

INDUSTRIAL PRICE INCREASES . . .

. . . for U. S. goods are a probability for the latter part of this year. They will result from wage increases that will be granted during the summer months and the upward pull of rising demand.

This does not mean that the U. S. economy is in for another surge of inflation. Farm prices are still relatively weak, so it is possible that the over-all cost of living will remain more or less stable.

Wage demands will exert the greatest pressure on industrial prices. Also, competition is forcing industrial manufacturers to develop new products and processes, and demand is creating a need for more capacity.

All this means that manufacturers will need capital and will, therefore, have to maintain their current profit margins. Inevitably, **this will mean passing increased costs on to the buyer.**

The federal government is deeply concerned over the prospects of a new round of price increases. Monetary and fiscal authorities are in agreement that an inflationary spiral would lead inevitably to a crack-up. Steps are already being taken to prevent such a spiral (McG-H Digest, June, *Financial Digest department*).

But the main checks to inflation will be increased capacity and higher productivity. For companies that sell directly to the American consumer, the presence of large, efficient manufacturing capacity in the hands of competitors should prove to be an effective restraint on prices.

AIR CONDITIONING FOR INDUSTRY . . .

. . . will become increasingly important on a year-round basis. Measurable increases in efficiency are rapidly turning what was a luxury into a production tool.

Metal workers are finding that with working areas maintained at a constant temperature and relative humidity, metal does not expand or contract to an appreciable degree. This makes it possible to cut the number of rejects of finely machined parts. When parts are machined at different temperatures to extremely close tolerances, rejects are unavoidable in spite of the most rigid production controls.

Other advantages are found in the manufacture of precision equipment where dust in the air can be a problem. Similarly, wet weather can saturate the air with sufficient moisture to rust delicate parts.

Manufacturers of air-conditioning equipment are uniformly optimistic about the future of industrial applications. And sales since the war would seem to warrant their enthusiasm.

One medium-sized manufacturer has increased sales 500% in the last 5 years. Another, still larger producer has more than doubled his sales in the same period. The picture is much the same across the industry.

Total sales of air conditioners, dehumidifiers, ice machines, and similar equipment for factory and commercial applications will approach $500-million this year. This compares to a total annual volume of some $170-million in 1949.

SALES OF IMPORTED GOODS . . .

. . . will improve in the U. S. as retail business climbs. At the end of the first half of 1955, retail sales stood about 2% higher than in '54. But retail sales of imports will better last year by 5% or more.

Heavy shipments recorded at U. S. ports include a wide variety of such household furnishings as chinaware, furniture, floor coverings, kitchen utensils, and other items.

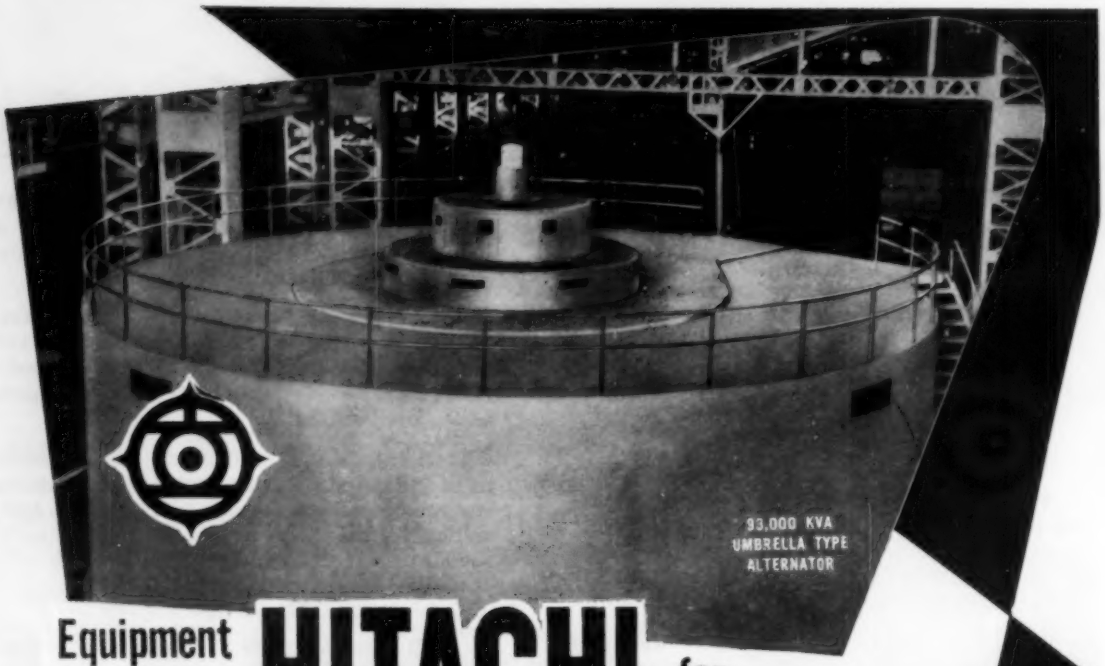
Foodstuffs from abroad are entering the U. S. at an accelerated pace, led by substantial shipments of fruits from Argentina and Chile.

You can expect imports to drop off during the third quarter, then come back with a rush to meet annual September-through-December orders. Here is the outlook for certain specific imported products:

Carpets: The rug business is sluggish in the U. S. Finished woven-wool carpet manufacturers complain about competition from abroad. But, at the same time, Belgian rug exporters claim that their sales to the U. S. have fallen sharply. Real reason for declining business is the growing popularity of "tufted" rugs—still a specialty of a limited number of U. S. manufacturers. **There will be no tariff cuts while business remains slow.**

Perfume: Demand is better than it has been for 2 years. A new Spanish perfume is finding an enthusiastic market. It may rival French brands in the future.

Foods: In spite of the fact that most foreign foods are more expensive than similar U. S. products, certain food imports—notably European pork—will do well. **Food imports generally will be down.**



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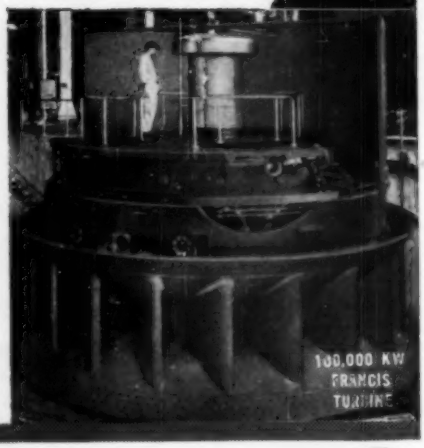

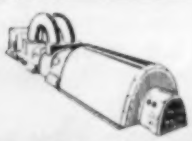
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INTERNATIONAL TRENDS

LONDON—

Britain should be able to look forward to continued prosperity, although there will be a more or less constant problem of inflation.

The net current situation: a slight degree of inflation; record high employment; rising wages; more cars, refrigerators and television sets; more houses; and more of everything in general than Britain has seen on the market in almost 20 years.

Production will be the key to Britain's prosperity. Index of industrial production at the end of the first quarter of 1955 stood at 140 (1948=100).

Orders for machine tools have risen sharply in the last 6 months, and with a critical labor situation. New equipment should permit production increases.

If production fails to keep pace with the rapidly increasing power of the domestic British consumer to buy, inflation will become a serious problem.

The cotton textile industry, sick man of British industry, is suffering primarily from many years of neglect and over-confidence. But even here, improvement can be expected. Manufacturers' excise tax on yard goods has been cut, and India, a big prewar market, has slashed import duties.

PARIS—

European economic integration will not become a reality in the near future. For one thing French industry is worried about competition. Industrialists emphasize the dangers of more integration as long as the French social-security system (which is a direct wage cost in the eyes of industry) remains more comprehensive and costly than those in effect in other European countries.

But while there may be no further integration, there will be greater cooperation. French and German authorities are already discussing a five-pronged program:

Trade will be expanded between the two countries, and there will be some long-term deals for the export of French agricultural products in exchange for French imports of a wide range of manufactured goods.

The Saar will import German goods, but not in such quantity as to create a serious drain on French foreign-exchange reserves. French exporters to the Saar will attempt to build and stablize their market.

German investment in North and Central Africa will increase. Industrial progress in these areas will depend mainly on the amount of investment in basics such as roads, railroads, power, port facilities.

France will encourage German investment in French industry. This will be negotiated at the broadest level when the question of investment in Africa is taken up.

International transportation between France and Germany will be encouraged. And special attention will be paid to Moselle River development and the regulation of freight rates to bring German coke to French steel mills at a more reasonable price.

WASHINGTON—

U. S. foreign trade will continue to rise through the year, according to confidential estimates of U. S. government officials.

Exports—excluding military items—should be about $13.5-billion compared with $12.7-billion last year, imports $11-billion compared with $10.2-billion last year. This assumes that business activity will hold up here with a slight sag in housing and automobiles compensated by gains in other lines, and also prosperity abroad.

Commodity distribution of the trend will be uneven. Big import increases so far have been in oil, lumber, hides, and rubber, plus a seasonal hump in cotton. Oil and rubber look near their peaks, hides and lumber could rise more.

Metal imports are lower than a year ago but should rise as the boom here spreads beyond cars and housing. Imports will not rise as much as domestic demand though as rising metals prices will spur domestic mining.

Country-by-country, the outlook is mixed too. Some, like the United Kingdom and the low countries, Scandinavia, and Australia, will be buying less and trying to sell more as they fight inflation.

Germany will go the other way, increase internal consumption and imports at the expense of already over-fat reserves. Canada and the rest of the Commonwealth should stay about even. Brazil and the other coffee countries are in serious trouble. **U. S. imports from and exports to these countries will sag.**

Foreign countries should add to dollar reserves again this year but at a much slower rate. Last year foreign reserves rose $1.7-billion. This year they will not go up more than $500-million to $1-billion.

Bethlehem Buys from the World

To help make its millions of tons of steel each year, Bethlehem imports raw materials from 41 countries around the globe.

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701E

JULY 1955
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Mc GRAW-HILL
DIGEST

SILICONE RUBBER bonded to two specially-primed metal plates defies efforts of chemist as he tries to break joint.

POLISHES for automobiles and furniture provide a huge outlet for silicones. They last longer, shine easily.

Silicones: Growth to Come

A fabulous chemical family awaits its future. Needed: consumer awareness, boldness in promoting that awareness.—An original Digest article

FROM A LABORATORY CURIOSITY to very nearly a household word—that, in brief, is what has happened to an amazing group of chemicals called silicones.

Technically, silicones represent a unique union between organic and inorganic substances. Its molecule consists of a rugged backbone of silicon and oxygen atoms—the basic structure of quartz. Attached to this backbone is a variety of organic chemicals.

The kinds of chemicals and their arrangement fix the properties of the individual silicone compound. The result is a group of materials—oils, greases, rubbers, plastics—with the built-in stability of sand.

Silicone preparations have already caused revolutionary changes in the baking, electric and tire-making industries. They have made possible suntan lotions that will stay effective after repeated dips in the ocean; preventives for diaper rash and dishpan hands; and baby-bottle nipples that are tasteless, odorless, clog-proof, and can be repeatedly sterilized.

All kinds of clothing have been silicone-treated to make them water-repellent and spot-resistant. In some cases, the treatment actually seems to improve the appearance of the fabric. Paints, waxes, coatings of all types, mold-release agents, defoamers, and so on make up an almost endless list of silicone products that perform jobs either better than or not possible with ordinary products. One enthusiast sums up silicones this way: "Of course, they can't do everything. Not yet, anyway."

Behind this imposing list of products and applications lies the work of three groups. An English professor's study of silicon-carbon compounds ended with a mess that all but ruined his equipment. A group of American chemists explored the possibilities of "glass-like plastics" and "plastic-like glass." Still another group searched for a way to improve electrical insulating materials.

Like many other products, silicones got their first boost in wartime. The military, looking for effective aircraft ignition sealing compounds and extreme temperature lubricants, turned to silicones. Their value led one engineer to make this observation: "Extended flight above 35,000 ft. would be virtually impossible without the aid of silicones."

They Excite the Imagination

In the U. S., two significant facts about the silicones are beginning to emerge:

- Silicones catch the imagination. And they often have properties that make the seemingly impossible work out.
- Silicones are branching out into consumer items and are building a reputation with the public; their magic name can often sell the product instead of the brand

"... industry feels basic exploratory period has closed ..."

name being salesman for the silicones.

With this consumer-consciousness growing, the two major U. S. producers have finished their latest round of expansion. And a third company will soon begin marketing the output of a brand-new plant. Annual sales of the industry, now running at about $30-million, will spurt sharply.

General Electric Co.'s new plant at Waterford, N. Y., cost $13-million. Dow Corning Corp.'s expansion of its Midland, Mich., plant cost $16-million. The "big two" will soon become the "big three" when Linde Air Products Co. (division of Union Carbide & Carbon Corp.) opens its new plant. Reported cost is more than $13-million. Allied Chemical & Dye Corp.'s Barrett Division, fourth-ranking producer, has no expansion plans. For the time being, it will stay on a pilot-plant basis.

The silicone market development has been slow, complex, expensive; pioneers have had to support research and sales service staffs far out of proportion to the actual poundage sold. The industry feels this basic exploratory period has drawn to a close. Many new developments are still in the research stage, but a dozen or more general markets have been firmly established.

Thus, the industry feels, its base is now large enough to support full-scale production and marketing operations. This thinking has led to expansion by G. E. and Dow Corning, and to Linde's going into full-scale production after several years of pilot-plant operation.

After Linde gets into production, the industry will probably level off for a short time. The big job for the companies was consolidating their markets. By next year, it is felt, enough markets will have grown to provide room for everyone.

SILICONE FOAM permits red heat on one side, cool touch on the other.

Elsewhere: Slow Growth

Growth of the silicone industry outside the U. S. has not been as rapid. But all major countries are well aware of the material's potential and most have plans for capitalizing on this potential.

In England, the biggest problem facing the industry is telling the market what silicones are, how and where they can be used, and what are their advantages. So far, this has been a slow but rewarding process. Right now, manufacturers have marketing and advertising plans that are sure to leave a lasting impression on both the industrial and public consumer.

Midlands Silicones Ltd., licensed by Dow Corning, turns out 200 tons annually, with 600 tons possible under the present plant setup when market conditions permit. Imperial Chemical Industries, Ltd., is Britain's other producer. Licensed by General Electric, it is making up the difference between its production and orders by imports from G. E.

The range of products and their applications being pushed by the two producers include silicone oils, greases, and rubbers for the aircraft industry; water-repellent preparations for textiles and masonry; hardening agents for furniture and car polishes; release agents in industrial molding. The bulk of present sales is for the military. But there is considerable optimism over the potential in the textile industry—not only because of water-repellent properties, but also because of silicones' contribution to luster, feel, drape, and stain resistance.

It will require 5 or 10 years for the British silicone industry to reach the state of that in the U. S. By 1960, production and sales will top 4,000 tons a year—ten times the current sporadic 400-ton-a-year rate.

In Germany, the fabulous rebirth of the chemical industry has left silicones far behind. Emphasis has been placed on other segments of the industry and only lately have there been some signs of life in silicones. Two companies, Wacker and Farbenfabrik Bayer, meet all West Germany's requirements for silicones. Both operate under licensing agreements with U. S. companies.

In France, silicones are manufactured by two of the biggest chemical companies, Rhone-Poulenc and Saint-Gobain. Products go into construction materials, electrical insulations, waxes and polishes, paints and varnishes, cosmetics, containers, mold-release agents, and anti-foam agents.

Most of French silicone production and imports find industrial uses, but new consumer uses continually appear. In the near future, the consumer market will be making large demands on the silicone supply.

Demand Grows in France

Demand for silicones is growing rapidly. The estimated French production of 300 tons in 1955 will not meet demand and silicones will have to be imported. However, Rhone-Poulenc has built a new plant for producing silicones. This plant will soon be able to supply the French home and export markets and possibly the entire European market.

Italy meets all its silicone needs with imports from France and the U. S. Industry experts feel a domestic plant for manufacturing silicones is not justified at present. But a government agency is reported to be considering such a plant. Any sizeable domestic output will have to wait for a broadening of present markets for silicones and the development of new ones. This is a matter of time and

educating industry and consumers to the virtues of silicones. In 5 years, demand may increase tenfold—from the present estimated 100 tons to 1,000 tons.

At present, a broad range of silicone products is available. High-temperature lubricants, special rubbers, cosmetics, anti-foam agents, and various types of electrical insulations are all available. Just recently, the textile industry began treating fabrics with silicones. Big gains are expected.

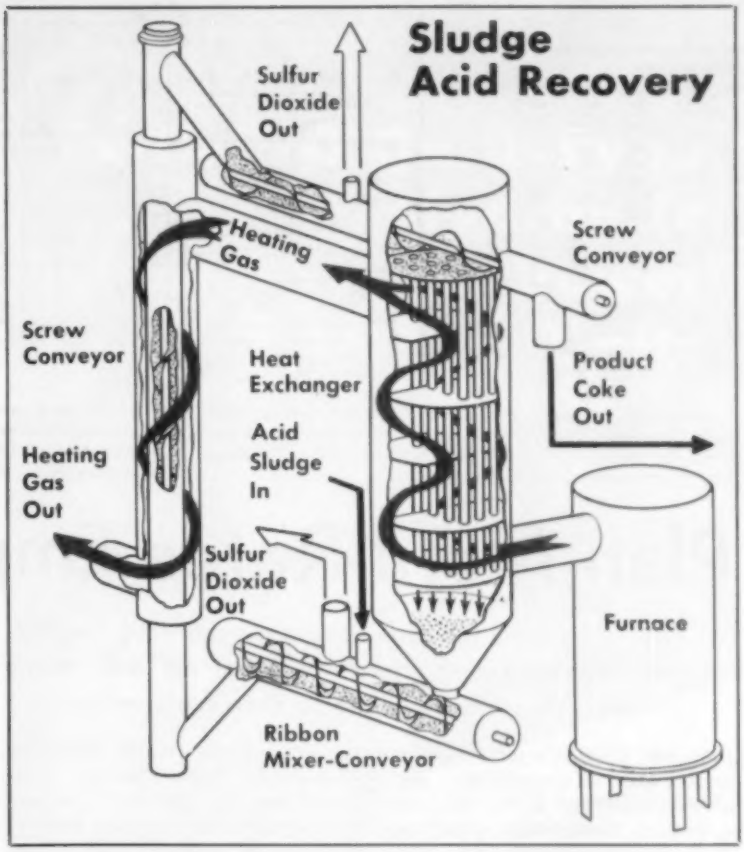
Japan meets its needs from both domestic production and imports. Shin-Etsu Chemical Co., Ltd., and Tokyo Shibaura Electric Co., Ltd., combined have an output of 180 tons yearly. A third company, Sumitomo Chemical Co., will shortly be in production with an output of about 100 tons annually. Imports total about 100 tons each year of silicone products. Finishes and coatings, anti-foam agents, rubber, and lubricating oils and greases are the major products.

The immediate target for the industry's present growth cycle is the elimination of the need for imports. But Japan's effort will be hobbled by its basic lack of raw materials. In any event, an output of 800 tons of silicone intermediates by 1960 will fill foreseeable domestic demands.

Imports Meet World Needs

Elsewhere in the world, most countries will depend on imports for some time to come. This is especially true of Latin America. The very nature of silicones implies a specialized product practical for manufacture in highly-industrialized countries only. But this does not mean that the silicone industry is at or near its full growth. Their unique properties have made good products better and some impossible products possible.

As such, the continued world improvement in living standards is certain to bolster demand for more and better products. With this demand will come demand for silicone products and silicone-treated products. And as markets expand and production increases, silicones will surely fall in price.



Sludge Acid Unit Improves Coke Quality

Digested from Chemical Week, Apr 30, p38—High concentration of the product (sulfur dioxide), better coke quality, more efficient acid recovery, lower costs, and simpler equipment needed are the advantages of W. Sonneborn Sons, Inc.'s new sludge acid recovery process. Daugherty Refinery is operating one setup, and Stauffer Chemical Co. will soon have another on stream to treat 55% acid sludge from a Standard Oil of Indiana refinery. Key to the process is recycling of coke to carry heat needed to decompose the sludge in absence of air. Decomposition occurs in mixer.

Study Project Defines A Good Supervisor

Digested from Personnel, May, p530—What does a good supervisor do? How does he behave? Are his activities primarily concerned with people or does he concentrate most of his attention on things? How do the traditional concepts of organization and management stand up to scientific management?

A recent study at the University of Southern California (Factors Influencing Organizational Effectiveness: A Final Report) asked some of these questions. Among its tentative findings: the better supervisors are good team workers; they practice the modern art of personnel counseling; they communicate to others and listen to workers. On the other hand, they are also disciplinarians, but not martinets.

Soundly-based human relations increases productivity. Team spirit can be created by systematic procedures. But team spirit is not enough. Tasks must be analyzed and grouped logically into jobs and sequences. And supervisors must have adequate authority.

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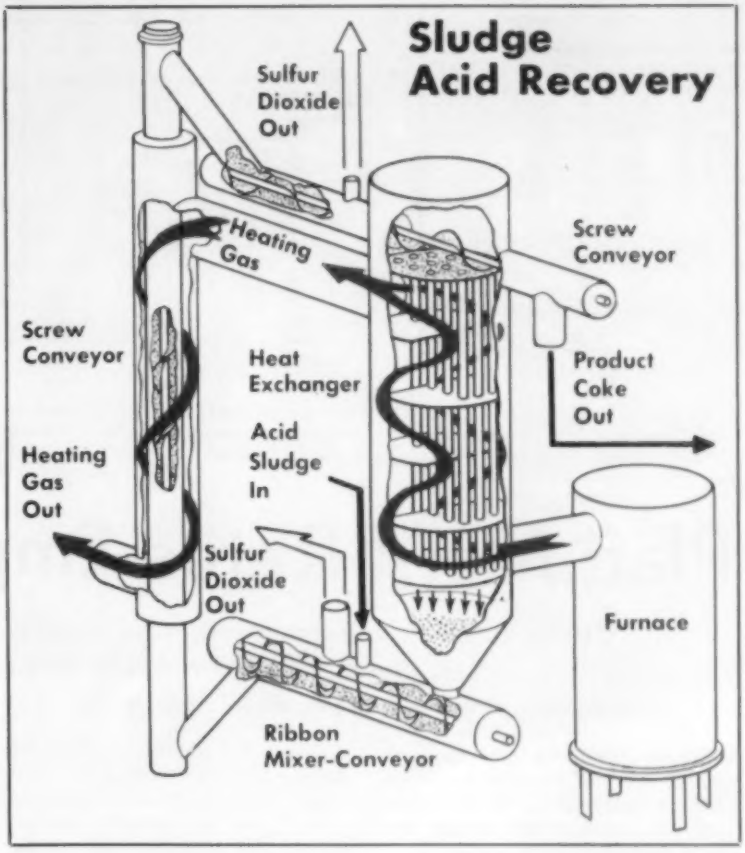

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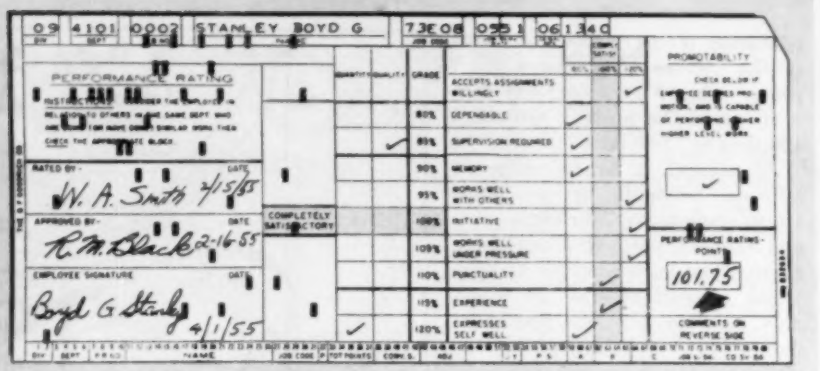
DIVISION "B" EXAMPLE

DIVISION "A" EXAMPLE

BUDGET CONVERSION CHART

ACTUAL TO NORMAL (PAYROLL RATIO)		AVER. YRS. OF COMPANY SERVICE IN DIV. 0-6	6-10	10-15	15 AND UP
100% OR LESS		MAXIMUM BUDGET FOR MERIT INCREASE (%)			
100.01	101.00	(80)	90	100	100
101.01	102.00	70	80	90	100
102.01	103.00	60	70	80	90
103.01	104.00	50	60	70	80
104.01	105.00	40	(50)	60	70
105.01	106.00	30	40	50	60
106.01	107.00	20	30	40	50
107.01	108.00	10	20	30	40
108.01	109.00	0	10	20	30
109.01	110.00	0	0	10	20
110.01	111.00	0	0	0	10
111.01 AND OVER		0	0	0	0



1. **BUDGET** for merit increases. Company sets a "merit raise" budget. Then each division determines size of raise —on the basis of its ratio of actual payroll to "normal," and on employee length of service.

2. **RATE** each employee's performance. Ratings like this determine whether or not an employee gets a raise. Supervisors rate quality, quantity, and ten other factors on punched cards. Each factor is measured in points.

Plan Merit-Rates Employees

Looking for a merit-rating plan your employees will approve? Here's one that not only meets that condition but also helps keep costs in line

DIGESTED from Factory Management and Maintenance, May, p118—Employees at B. F. Goodrich Co.'s Akron, Ohio plant like their new merit-rating program. Here's how it works.

Merit rating is done during the first and third quarters of each year with raises effective April 1 and October 1. For each merit-rating period, B. F. Goodrich establishes a budget for merit increases for each division. It is based on (1) general economic conditions of the company and (2) the over-all company ratio of actual wages to "normal"—the midpoints of the salary ranges.

When this ratio of actual to normal is about 100%, the company might recommend, for example, only a 2% maximum budget for merit increases during the next period.

Once this maximum budget percentage is set, each division within the company must then determine whether or not it can grant merit increases up to this maximum percentage. This depends on two factors:

1. Actual-to-normal payroll ratio within the division. For instance, if salary-range normals in division "A" ran $1C ,00 per month and its actual-to-normal was not over 100%, that division would be allowed a maximum of $2,000 per month for merit increases. A division whose actual-to-normal is over 100% will have an allowable budget percentage less than the maximum 2% budget. (See Budget Conversion Chart, above.)

2. Average length of company service of employees within the division.

Year-of-service brackets have been based on the average service of all employees covered by the plan. (See Budget Conversion Chart.)

For example, suppose division "A" has a ratio of 104.2% (actual salaries of $104,200 vs. total of all the midpoints of each salary range of $100,000). Average length of service with the company in this division is 7 years. Merit rating budget for division "A" then is $100,000 x 0.02 x 50% (from table) = $1,000.

Division "B", however, might have a ratio of 100.2%, normal salary of $100,000, and average service of 5 years. Its budget would be $100,000 × 0.02 × 80% = $1,600. Divisions with ratios of 100% or less get the full budget allowance, 2% in this case.

B. F. Goodrich rates 12 performance factors (punched card, right above). Lowest rating is 80%, "completely satisfactory" performance rates 100%, highest rating is 120%. Quantity and quality factors get heaviest weight—35% each of the total points. Each has nine degrees from "best to worst." The other ten factors weigh only 3% each and each has only three degrees.

The company converts directly

POINTS TO DOLLARS

POINT SPREAD	SALARY RANGES JOB GRADES C	D	E	F	G	H	I	J	K
80.00 to 82.99	$242	$248	$258	$274	$289	$310	$331	$347	$367
83.00 " 87.99	250	257	268	285	301	324	346	364	386
88.00 " 92.99	258	266	278	296	313	338	362	382	405
93.00 " 97.99	266	275	288	307	326	352	378	400	424
98.00 " 102.99	274	285	(298)	319	339	366	394	418	444
103.00 " 107.99	282	294	308	330	351	380	409	436	463
108.00 " 112.99	290	303	318	341	364	394	425	454	482
113.00 " 117.99	298	313	328	352	377	408	441	472	502
118.00 " 120.00	307	323	338	364	390	423	457	490	522

3. **TRANSLATE** rating into salary. Employee (card above) has grade "E" job. Rating of 101.75 points indicated $298 salary.

from the merit-rating point score for an individual to the actual salary within his range. (See chart, "Point to Dollars." When converted salary is greater than present salary, the difference is granted as a merit increase. No reductions in salary are made, however, when the converted salary amounts to less than present salary.

When a division does not use up its budget, it has authority to apply the surplus for increases to those employees whose performance rating does not warrant an increase but whose long service, dependability, or loyalty, the manager feels, deserves a reward. No increases, for any reason, can exceed the top of the salary range.

Supervisors and department managers do the rating. First step is for the supervisor to rate the people in his department on a separate form called a "spread sheet." The supervisor then justifies his spread-sheet ratings to his department manager. The manager, in turn, checks ratings for his department with a divisional rating committee made up of key division managers.

If the rating committee is satisfied that ratings are justified, the spread sheet is returned to the supervisor who records ratings on the punch card.

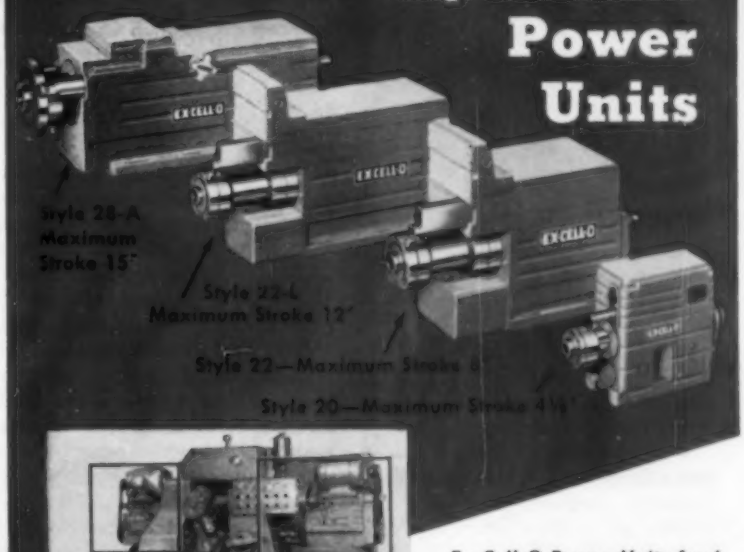
Rating cards are punched and tabulated in the accounting section. This provides a quick analysis of results. A list of promotable employees by job classification is forwarded to the employment department to facilitate the practice of promotion from within. The supervisor then discusses the rating with the employee who may sign the rating card. Almost all do.

Four things in particular contribute to the program's success:

- It does not bypass the line organization. It concentrates training effort on supervisors, makes them responsible for bringing the program to employees.
- It makes sure employees know just how the plan works.
- Top management sanctions and supports the plan.
- Salary ranges are regularly reviewed to make certain they are competitive within the Akron area.

For High-Production Machines use.....

Ex-Cell-O Quill-Type Hydraulic Power Units



This special machine with automatic indexing fixture core-drills piston pin holes and drills angular oil holes. It uses six Ex-Cell-O Power Units (shown without belt guards) operated from a central push-button station.

Ex-Cell-O Power Units feed and rotate tools in easily controlled automatic cycles. A single tool can be held in the unit spindle or a multiple head can be bolted to the quill flange. The Units are used in low-cost, high-production machines for such operations as drilling, reaming, counterboring and spot-facing. A typical machine consists essentially of a plain base, a work-holding fixture and one or more power units.

Ex-Cell-O Units are self-contained and compact; can be mounted horizontally, vertically with the spindle nose down, or at any angle between these positions. For details about these units write, or cable Ex-Cell-O in Detroit.

EX-CELL-O CORPORATION

Detroit 32, Michigan, U.S.A.

CABLE ADDRESS: XLO, DETROIT, U.S.A.
PRECISION MACHINE TOOLS • CUTTING TOOLS • MACHINES TO PACKAGE MILK IN SANITARY PAPER CONTAINERS.

XLO

55-25

Challenge to Sales Managers

To improve his job performance, every manager needs standards. For the sales manager, there are at least these six standards:

1. **Spend most of your time with your salesmen.**
2. **Give up all work that someone else can do.**
3. **Have great expectations for your salesmen.**
4. **Make democracy work on the job.**
5. **Set up and use an appraisal program.**
6. **Be a constructive critic.**

DIGESTED from Sales Management, May 1, p36—The six standards above involve attitudes and skills that successful sales managers apply. The term "sales managers" refers to all sales executives whose basic responsibility is the direction and upgrading of salesmen. Let's examine each of these standards. Although aimed specifically at sales managers, the standards and their meaning apply equally well to all management.

1. Spend most of your time with your salesmen. If salesmen are a valuable company asset, they deserve a lot of direct attention from their manager. How much time? One of the largest chemical companies has this policy: "Sales managers should spend at least 50% of their time stimulating their salesmen."

A leading paper-products company recently raised this allotment to 70%. Such sales managers spend their time with salesmen in their territories, writing them personal notes and memoranda, visiting them and their families, holding district or divisional meetings, working out personal appraisals with them.

2. Get rid of all work someone else can do. One sales manager insisted on proof-reading every bulletin and pamphlet before it was printed. When convinced that his secretary could do the job as well as, if not better, than he could, he shifted the task to her and thus saved himself a lot of time for more important things.

Another sales manager was buried under a load of correspondence. He did two things to free himself: (1) he doubled his silent reading rate through a course in reading improvement, (2) he trained his secretary to write most of the replies.

It would be wise for a sales manager to make a detailed inventory of the tasks he performs. He should indicate those functions he can delegate. He can then delegate them, thus freeing his time for contacts with his salesmen. Three things are accomplished: (1) he is freed for more creative activities; (2) he develops the latent abilities of others, (3) he soon realizes that while other may do things differently than he, the things get done—and often better.

3. Have great expectations for your salesmen. Sales managers sometimes forget that salesmen are one of the best sources of information and guidance. But top management has to ask them.

Sales managers who rely on their sales men for information for suggestions, for guidance in helping to mold company sales policy are seldom disappointed with the results. And the morale of their salesmen is high. For it is the nature of most men to respond to challenges that let loose their constructive thinking and efforts.

4. Make democracy work on the job. Great expectations thrive best in a democratic environment. But the environment must be cultivated—from top management down. A divisional sales manager cannot get far in sharing his leadership with his salesmen if he is stymied by his top management.

Psychologists tell us that no job incentive is more stimulating to salesmen than "identification." Any policy that salesmen help to formulate becomes "their" policy. Their support of it is thus assured.

5. Set up and use an appraisal program. If the sales manager should constantly improve his sales force, he needs some systematic way of doing so. An appraisal of each salesmen with special emphasis on the job he is doing—given him at least once a year—is an excellent system.

But an appraisal system must be "sold" to the salesmen. Ideally, they should be asked to help in preparing the appraisal form. Suggestions from the salesmen may be classified under:

- What a salesman of our company should do.
- What a salesman of our company should know.
- What a salesman of our company should be.

From these suggestions an appraisal form is built. The form may then be distributed to the salesmen, with the suggestion that, because of the result of their thinking, they use it. They may be invited to appraise themselves on this form. This simple procedure can go a long way toward improving salesmen. They improve simply because their job has been defined by themselves in a detailed way.

6. Be a constructive critic. The reasoning goes like this:

First premise: When you have high morale among your salesmen, the miraculous is possible; you need high morale to hold and build sales.

Second premise: Nothing is more harmful to morale than fault-finding; nothing builds high morale more surely than constructive criticism.

Therefore: Every sales manager who would have high morale among his salesmen makes sustained use of constructive criticism.

NEW IDEAS TELL HOW TO . . .

. . . get better-wearing tires

Digested from Chemical Week, Apr 30, p64—Buy tires with polyurethane-rubber treads is the answer. But it's not quite that easy. There's still a tough problem tire makers have to solve—anchoring the polyurethane tread to the carcass.

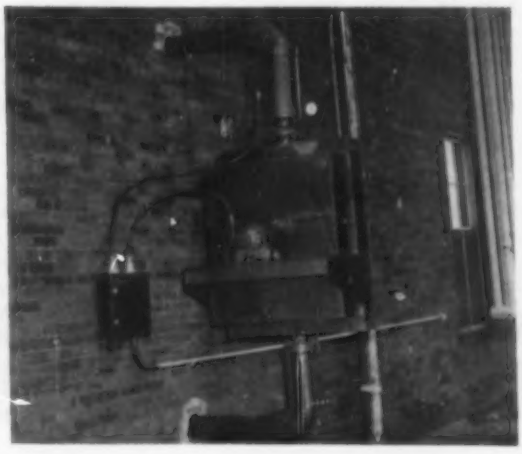
Polyurethane rubber, although unexcelled in wear resistance, is incompatible with other rubbers and resists bonding to them under heat and pressure. Firestone reports good bonding but at an almost prohibitive cost. Goodyear has a new bonding agent, but there is an occasional failure. Tire makers see the future big market in truck and heavy-duty tires.

. . . control machine motion

Digested from Control Engineering, May, p92—Machine control through pulse count is the function of an electro-mechanical control system. Made by American Electronic Mfg., Inc. (Culver City, Calif.), it alternately counts two series of pulses for proportional or motion control.

It is shown controlling a Sheridan-Gray 40-ton stretch-wrap forming machine. The controller's function here is to limit and indicate forward-backward motion of a die. Set-up time is saved because on a rerun known control numbers can be quickly programmed simply by setting switches.

. . . restore transformer output

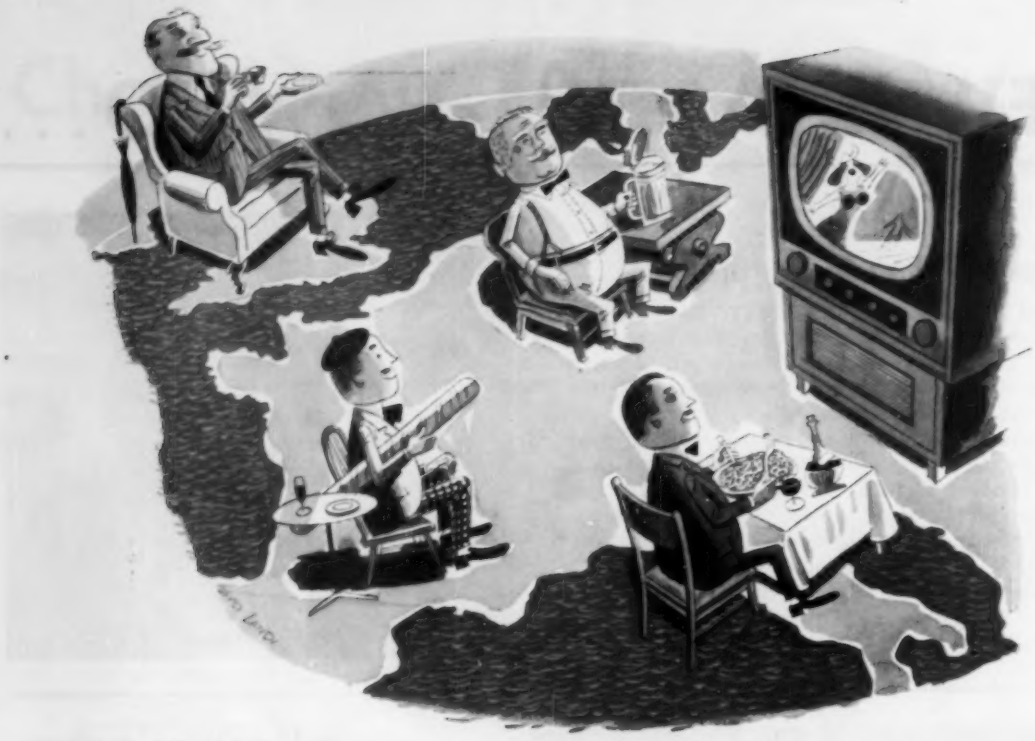


Digested from Electrical World, May 2, p89—Installation of an electro-cooler on a 4,500-kva. transformer, in operation since 1912, restored capacity to 6,000 kva. This was done without exceeding the maximum permissible top oil temperature of 70° C.

The electro-cooler was installed without removing all the transformer oil and without untanking the core and coils. Oil was drained from the transformer tank to lower the level about one foot, without uncovering the windings.

The cooler dissipates 50-kw. of heat when the incoming oil temperature is 35°C above ambient.

Before the cooler was installed, maximum load for the transformer was 3,500 kva. without exceeding the 70°C. permissible top oil temperature. Now by using the electro-cooler alone the capability is 4,500 kva.



European TV Hits Its Stride

There are still problems—technical, financial, and in questions of language. But progress is being made toward national networks

DIGESTED from Electrical Merchandising, Apr, p84—European television seems to be headed for a record year. This could have a major impact elsewhere in the world. It could, conceivably, mean more sales of European television sets in Latin America, and it might result in sales of sets in the U. S.

The outlook for this healthy European industry is sparked by:

- Price reduction on German television sets that may increase sales there, and the British industry's hope that 1955 will top last year's sales of 1.2-million sets.
- Introduction later this year of commercially sponsored programs in Britain, which might lead to Continental transmission schedules.
- The creation of a European network that has dramatized television for millions to whom it was only a foreign luxury before last year.

Taken country-by-country, here are the prospects for the European television industry.

Britain still remains the key to industry development, but there are certain problems to be solved. For one thing, Britain's 30-cycle power supply causes a flicker visible to the eye. But apparently home audiences are accustomed to the problems of incandescent bulbs and do not seem to notice it.

Some British manufacturers are beginning to eye the U. S. market. Cheaper labor lowers production costs and certain firms feel that this will give a competitive advantage. U. S. manufacturers, on the other hand, are confident that mass-production techniques will offset this advantage.

In terms of television, Italy ranks second only to Britain in Europe. In 1953, Italy had practically no television at all. Today, she has a network of three stations (Milan, Turin, and Rome). All are operated by the government radio corporation. Additionally there are five transmitters repeating national programs in north and central Italy. About 45% of Italy's population is now within reach of television transmitters and, before the end of 1956, the network will extend through a new station at Naples and repeaters in Sicily and Sardinia to 85% of the nation's population.

In France, the government network—Radio-Television Francaise—is nationwide with transmitters in Lille, Metz, Marseilles, Strasbourg, Lyon, and Bordeaux. All of these rebroadcast programs initiating in Paris. There is about 40 hr. of transmission a week.

Two stations are operating Brussels, one in Liege and one in

Antwerp. The Belgian government, which owns the network, is thinking of accepting advertising as a means of solving its economic problems, but it has a unique difficulty. The French-speaking population represents the better market, but there must be equality in programming for the Flemish-speaking part of the country. But advertisers find the Flemish population a less interesting market.

Switzerland (with three languages to cope with) has two stations operating at Zurich and Geneva, one transmitter being built on the Dole Mountain between Geneva and Lausanne, and one each at Bene and Basle. There are plans to build still another at Lugano or Locarno for Italian-speaking Switzerland.

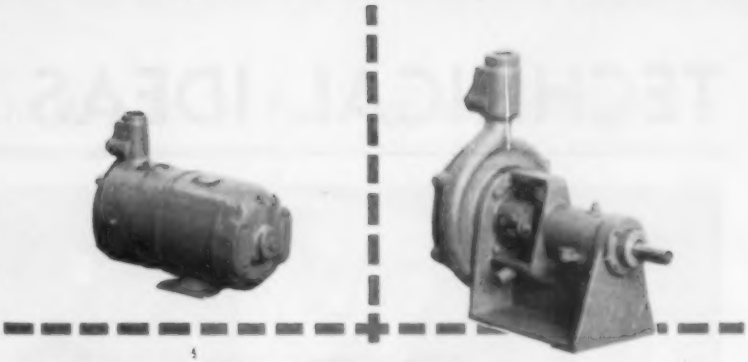
Experimental stations are operating in Copenhagen, Stockholm, and Oslo. The Danes are about to launch a national network, hoping to build about six stations.

Vienna is building a station this year, which may be ready for operation in 1956. The Austrian government has elaborate plans for a national network that are still in the planning stage,

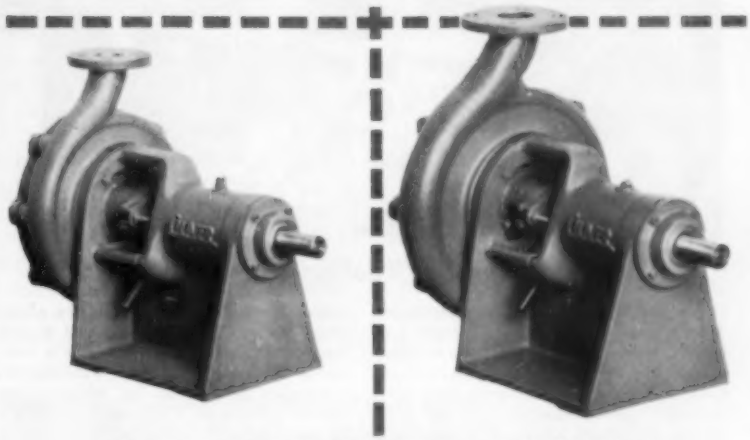
Expanded Metal Railing

Digested from American Builder, May, p160—A small eight-apartment building in Sarasota, Florida, was cleverly designed to make the most of balconies. The design overcomes an old problem: how to make safety railings attractive.

This was done by the use of ¾-in. diamond-pattern expanded metal welded to 1¼-in. posts bolted to concrete. These railings are rigid, yet do not cut off the view.



OLIVER Type L
Centrifugal Pumps



Compare these positive advantages . . .

Self-venting — high cut-water keeps air out . . . simplifies priming . . . holds prime better when pump is in operation.

Simple piping — inlet and outlet connections in same vertical plane.

Large diameter impeller — single shroud type for high efficiency.

Corrosion resistant — all contact parts in 1″ size constructed of Carpenter 20 stainless . . . 1¼″, 1½″ and 2″ in Carpenter 20 or No. 316 stainless, bronze or cast iron.

Interchangeable — all parts on 1½″ and 2″ sizes are interchangeable except for casing, cover and impeller.

This new pump is now available in four standard sizes. Bulletin No. 310 contains the information you'll want to have. Write for a free copy today.
Dorr-Oliver Incorporated,
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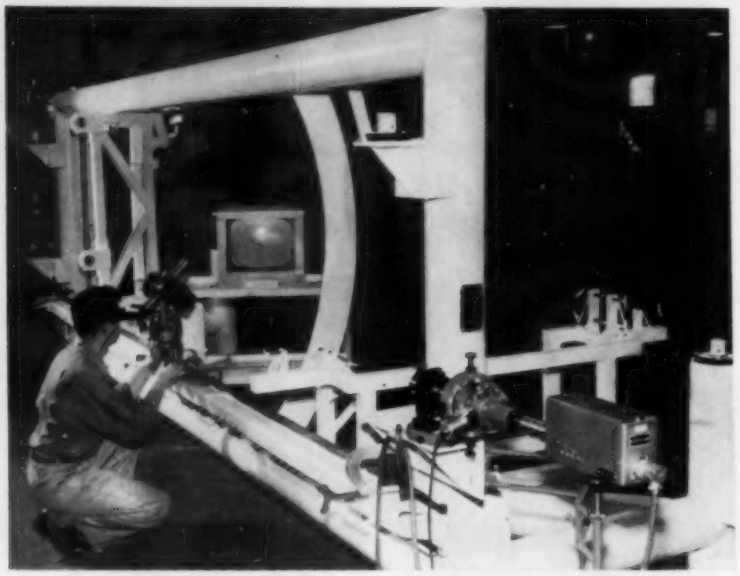
TECHNICAL IDEAS . . .



Television-Optical Tooling Proves Accurate

Digested from American Machinist, May 9, p178—Douglas Aircraft Co. has developed a new system combining closed-circuit television with optical tooling for building aircraft assembly fixtures. Telescopes and targets give optical reference lines. The television camera looks into telescope eye piece, picks up reference points, and beams image, magnified 300 times, to a television receiver. Operator watches the television screen as he adjusts the optical square in 5 sec. to an 0.00001-in. accuracy.

Crossing Safety—To reduce the number of accidents at railway crossings where tracks pass through urban areas, one railroad has adopted standard vehicular stoplights that are tripped by railroad traffic. A switching train approaching a crossing throws the street signal from green to yellow to red. An identical light controlling track traffic changes from red to green. System was laid out in cooperation with town authorities.—Railway Signalling and Communications, May, p39

Cloud Seeding—Scientists who have been testing the effects of "cloud seeding" on rainfall claim that there seems to be little effect from the process. There has been a widespread belief that dry ice and silver iodide dropped into clouds would produce rain.—Business Week, Apr 23, p108

High Speed Train—A French electric locomotive pulling three cars has attained a speed of 207 mph. on a stretch of 40 miles of straight track. To reduce speed to 125 mph., the maximum at which brakes could safely be applied, windows were opened to create the necessary drag.—Railway Locomotives and Cars, May, p62

Tests 10 Machines—Ten operators formerly tested ten adding machines at Burroughs Corp. (Detroit). Now one operator tests all ten at once. A master adding machine drives machines to be tested through a pneumatic-plunger system set up over their keyboards. The operator punches a key on the master and ten plungers simultaneously depress the same key on the test machines.—Factory Management and Maintenance, May, p135

Reduce Office Noise—In cases where a secretary answers a single telephone receiver with multiple extensions and numbers it is necessary to indicate the person who is to answer and on which number. One company found that having the secretary call across the office was noisy and that buzzers were not practical. The answer proved to be a household chime mounted near each desk. Secretary can operate the chimes selectively by a call box on her desk, thereby signalling the right person when there is a call for him.—Power, May, p123

Now Synthetic Paper—DuPont has made synthetic paper from nylon, Dacron, and Orlon. It's three to ten times as strong as ordinary paper and is resistant to chemicals, molds, bacteria, water absorption. Proposed uses: heavy-duty bags, filters, maps, tracing paper. Research results will be made available to the paper industry.—Chemical Week, Mar 5, p8

Radio Engineers Show—Annual Institute of Radio Engineer's show was the biggest ever: 40,000 engineers looked at the latest electronic technology. Among them: 36 new semiconductors and magnetic amplifiers, Du Mont's optical scanner that counts objects it sees, Philco's circuits based on surface barrier transistors, Millivac's hushed amplifier said to have less than 5×10^{-7} volt noise over a 60-kc. frequency band.—Control Engineering, May, p15

Coated Glass Bottles—Emulsifiable polyethylene is finding interest as a coating for bottles. Made by Allied Chemical & Dye Corp., this low-molecular-weight polymer can be spray-applied from a water solution on either or both the inside or outside of irregularly shaped containers. As a coating, the material promotes slip for such foods as catsup.—Mod Plastics, May, p232

Small Fork Lift Tractor

Digested from Construction Methods & Equipment, May, p78—On a 100 x 310-ft. brick, block and steel building, contractor Del Mickelson (Milwaukee, Wisc.) feels his 30-hp. Terratrac M-3 with interchangeable fork lift and dozer blade meant the difference between profit and loss. Equipped with the fork lift, the tractor carried full pallets of blocks to masons. As the job progressed, the tractor kept 15 to 20 masons supplied. Other jobs performed included: unloading cement, handling bricks, hauling mixing water, moving scaffolding, handling roofing materials.

Ultrasonics for Foods—Ultrasonics are beginning to prove useful in food processing. Among their outstanding properties: They may, like light waves, be focused, since they are directional. They are subject to a high degree of control. —Food Engineering, May, p80

Home-cleans Furs—New aerosol product, Fur Frost (made by White Frost Chemicals, Inc., New York), brings fur-coat cleaning into the home. Fur Frost is designed to be a complete substitute for expensive professional cleaning.—Chem Wk, Apr 23, p68

Maintain Finishing Rolls—Careful testing of rubber finishing rolls used in textile manufacture shows that service life is reduced not by normal hard wear so much as by overloading and improper storage.—Textile World, May, p126

Visible Grinding—New British bench grinder has abrasive bonded to underside of a horizontal steel disk. Slots in disk allow the operator to observe the surface being ground as he applies the workpiece to the abrasive disk.—Metalworking Production, Apr. 22, p737

New Drilling Mud — Magnolia Petroleum Co. has developed an inverted emulsion mud useable under almost all oil-well drilling conditions. Composition is emulsifiers, water-base mud, and refined oil or stabilized crude.—Oil & Gas Journal, May 2, p83

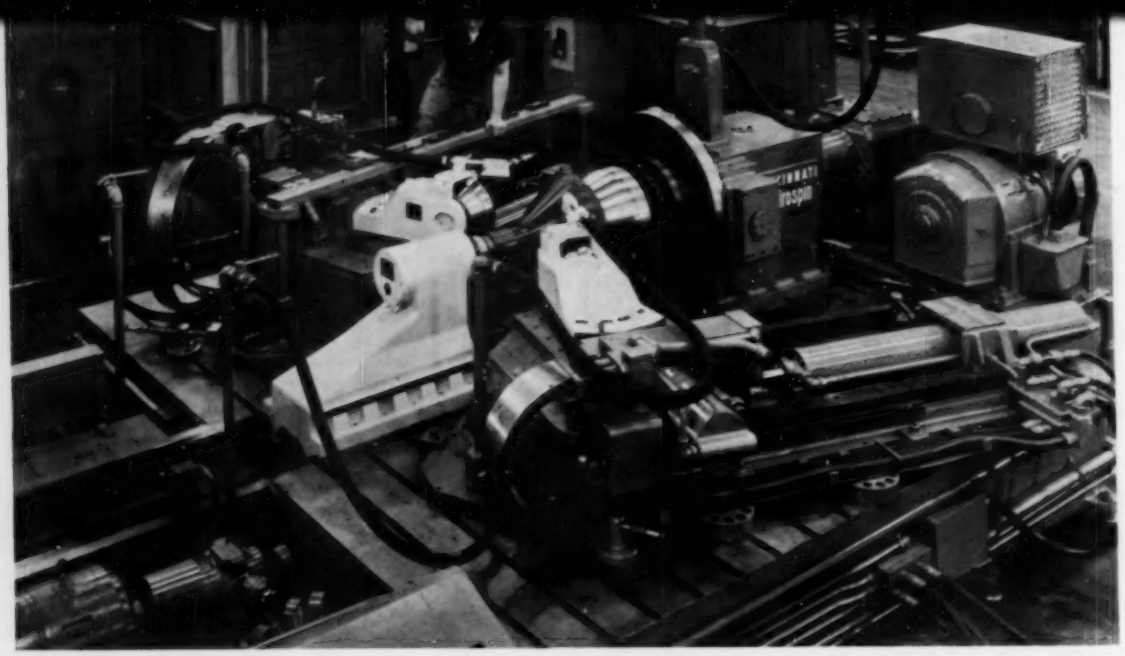
Super-pure Aluminum — British Aluminum Co. is offering 99.99% pure aluminum in commercial quantities. It's recommended for flashing and roofing materials, extruded cable sheathing, electrolytic condensers.—Product Engineering, May, p5

Wind Power Plant—British prototype wind-mill has a generating capacity of 100 kw. Turbine is driven by rapidly moving column of air, not by mechanical linkage with propeller. Blades are hollow; as wind rotates them, air is discharged through blade-tip outlets by centrifugal force. This air is drawn up through the main column of the plant. On its way, it turns over the turbine that drives the generator.—Eng News-Rec, Apr 28, p50

Microwave Ovens—General Electric Co. expects to have available in late 1956 household electronic ovens that use magnetron-produced high-frequency radio waves to cook foods. New ovens will cook much faster than conventional ovens. Feature of the GE unit is that it also browns the food as it cooks it, thereby giving it an appetizing-looking browned surface.—Electronics, May, p22

This Board Is Worth $19,480 a Month

Digested from Factory Management and Maintenance, May, p123—United Tube Corp. (Cleveland) has gained $19,480 in increased production through the display board shown above. It stimulates competition among four two-man teams that operate resistance-welding tube mills. Competition is in five areas—hours in production, scrap, set-up time, machine-repair hours, and speed. Lights show winning team in each area.



Cincinnati Hydrospin machine is tooled for final spinning operations on jet-engine turbine shaft

Spinning Cuts Production Costs

Cold power spinning forms hollow cones and cylinders at cost savings of up to 75% and, at the same time, boosts strength by 15% or more

DIGESTED from American Machinist, May 9, p126—Cold working attracts continued attention because the production man wants: (1) to make parts faster and stronger; (2) to save material; (3) to get the strength and other properties of heat-treated material without using alloy stock.

Effort at the jet-engine department of General Electric Co., in cooperation with the Cincinnati Milling Machine Co., led to the development of the Cincinnati Hydrospin machine. It can form hollow cones and cylinders of regular contour up to 42 in. in outside diameter and 50 in. long.

The machine has two slides carrying hardened steel rollers. Slides can be traversed at the same time or independently, as required by the spinning operation. Rollers, forced under high pressure against the metal to be formed, roll-forms it to the shape of the supporting mandrel.

Unit pressures may run as high as 400,000 lb. per sq. in. Pressures applied vary almost directly with the yield strength and thickness of the material being formed. On each side of the machine, the force available can form a ¾-in.-thick disk of annealed chromium-molybdenum steel to a 60° included-angle, straight-wall cone or tubing with ½-in.-thick walls through a 60% reduction in one pass. Spinning a disk of aluminum alloy, however, would require only a small part of the power available.

The Hydrospin can form cones of any included angle by placing each slide at half the angle to the machine's center line. Or one slide may be positioned to perform one operation, and the other to perform a subsequent operation in the same setup.

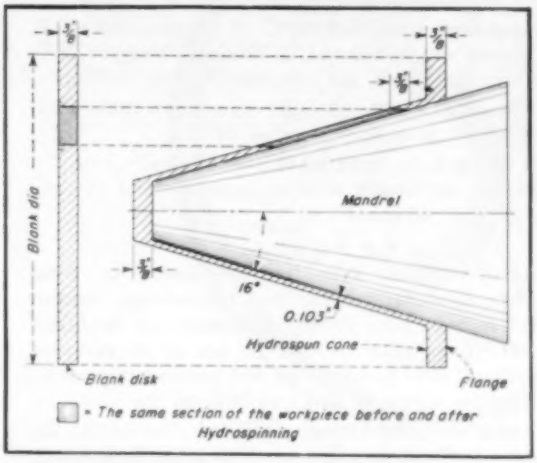
High-pressure spinning finishes parts faster than is possible by conventional machining methods. Less metal is wasted as chips than when highly stressed parts are machined from forgings. Spinning of many parts limits machining to a few light cleanup cuts on surfaces that cannot be spun. It has cut some part costs to from 20 to 30% of those made from full-size forgings.

Materials that have been formed cold by power spinning include aluminum alloys, mild steel, most types of stainless steels, and several high-temperature alloys. Spinning metals of hexagonal crystal structure, such as titanium, requires application of heat.

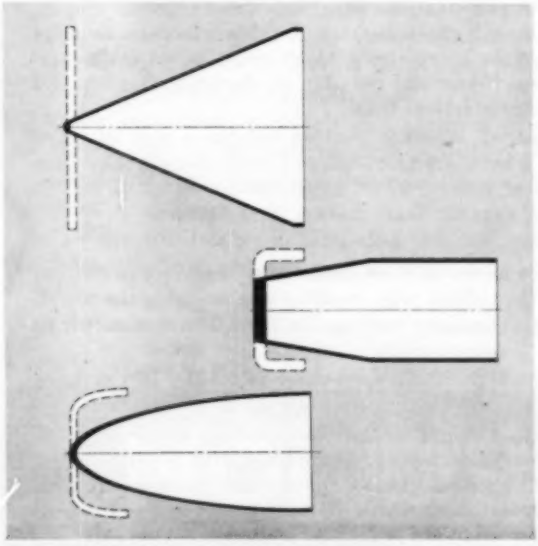
In cold spinning, both a lubricant and a coolant are needed. With low unit pressures, as in spinning aluminum alloys, soluble-oil coolants provide adequate cooling and lubrication. High unit pressures require separate cooling and lubricating media. Water-base coolants with high-heat-absorption qualities work best. An excellent lubricant is colloidal zinc suspension or molydisulfide paste swabbed on both mandrel and blank.

Finish of spun parts depends on the kind of material, the rate of feed, and roller design. Feeds range from 0.0005 to 0.168 in. per rev., with most production operations carried on at 0.030 to 0.050. Most materials spin best above 1,000 ft. per min.

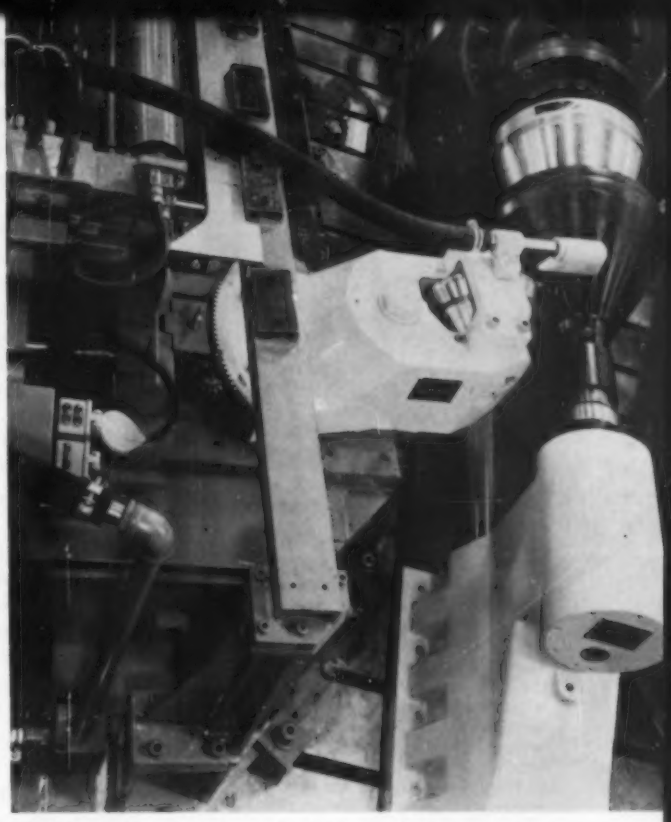
HEAVIEST PART Hydrospun is turbine shaft. It was spun in two operations from premachined forging. Included angle was changed to improve final spinning.



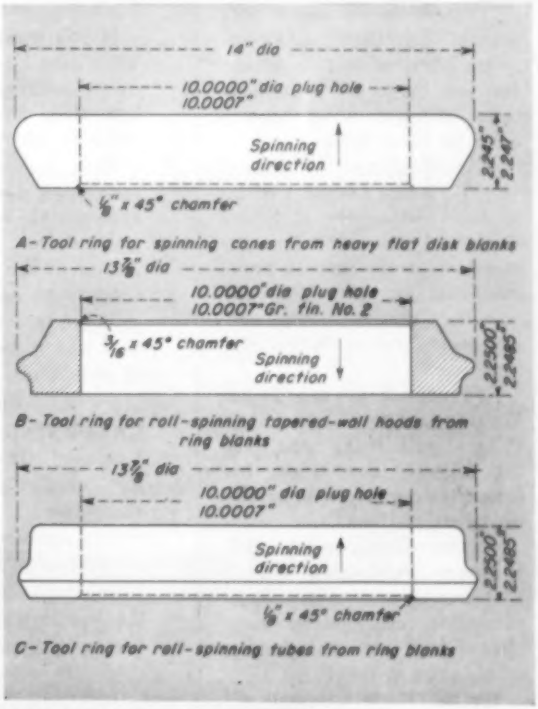
REDUCTIONS of 75% or more can be made in one pass in spinning cones on Hydrospin machine.



FLAT BLANKS are suitable for spinning cones. Preformed or machined blanks are for tapered walls.



CONTOUR TRACER is required when spinning curved-wall cups, stepped cones, or multi-diameter tubes. Tracer templets are made of ¾-in. hardened and ground tool steel.



TOOL RINGS on rollers are made of tool steel or carbide. Design varies with spinning operation.

Ball Valve for Glue

Digested from Modern Packaging, Apr, p164—Slight pressure on ball in custom-made cap releases just enough glue to make a dot or fine line. When pressure is released, the ball retracts into the cap orifice, completely resealing the tube. Ball valve consists of a threaded aluminum cap with an apex orifice into which a stainless steel ball is placed. A tapered spring serves to force the ball back into a closed position when pressure is released. Glutex Co. markets the dispenser.

We Bring You . . .

. . . good news again this month. The Digest has been given permission to abstract for you three more publications of outstanding importance in their fields.

• Architectural Record (F. W. Dodge Corp.) will be an excellent source of information on the newest developments in architectural practice and on the kinds of buildings that architects and engineers have on their drafting boards.

• Personnel (American Management Association) will bring you, via the Digest, the latest information on methods in industrial relations.

• Sales Management (Bill Brothers Publishing Corp.) will provide authoritative information on modern merchandising and distribution techniques in the U.S.

We bid them welcome.

PERSONAL DIGEST

HOW SAFE an automobile driver are you? That's a hard question to answer because most of us violate safe-driving rules, without even knowing it. The proof? Over 35,000 people killed and nearly 2-million injured in automobile accidents last year in the U.S. alone.

Driving too fast is the big killer—the cause of nearly half the deaths. Other big killers are driving on the wrong side, reckless driving, not having the right-of-way. These half dozen common-sense rules can save you a lot of grief:

1. **Don't drive after drinking.** Swedish researchers found that drivers after even three beers showed great confidence but poor judgement. One state survey in the U.S. showed nearly half the drivers in accidents had been drinking.

2. **Don't stop on a high-speed highway.** If you must stop for a traffic light, slow down gradually and flash your stop light.

3. **Avoid left turns from busy highways.** If you must turn left, keep your front wheels straight ahead; if someone hits you from behind, you'll go straight ahead, not into the opposite traffic.

4. **Slow down when rain starts.** A light drizzle can cause skidding for 2 hr., until the road scum washes off.

5. **Allow plenty of room** in front when crossing railroads.

6. **Keep at least one car length** between your car and the one in front for every 10 mph. of speed.

✦ ✦ ✦

PHYSICAL EXAMINATIONS, annually, can keep you from betting at two to five odds that you can beat the average. Reason for the poor odds: examinations by the University of Michigan of 500 business executives with an average age of 48 revealed 75% with abnormalities, 40% unsuspected and needing treatment. Each year, new diseases appeared in up to 20% of the men.

If you want a complete examination, what does the doctor do, what does he look for? First, he asks questions about headaches, colds, coughs, chest and other pains, appetite, sores, your work, how tired you get, how well you sleep, diseases you have had, injuries, operations, even your family history.

Then comes the examination—skin, hair, nails, lymph glands, ears, eyes, nose, throat, chest, heart, pulse, lower organs, nervous system. He will make a urinalysis, blood count, blood sedimentation rate test, chest X-ray, and possibly an electrocardiogram and X-rays of the gastrointestinal tract.

What do you learn? Whether you can breathe a sigh of relief or begin treating what's wrong. That 40% that thought they were well had 4 cases of cancer, 27 of hypertension, 16 of ulcers, 12 of gallstones, 8 of organic heart disease, 3 of diabetes.

✦ ✦ ✦

GARDENING as a hobby is a lot easier now than it was not too long ago. Of all the tedious jobs, weeding was probably the worst. But garden hobbyists, as well as farmers, have turned to chemicals.

The most common chemical weed-killer is 2,4-D. If you have a lot of weeds, spraying by tank or hand sprayer is best.

For fewer weeds, you can do the job standing up by applying 2,4-D with a Killer Kane, a long plastic-tube with a valve at the bottom to squirt individual weeds. Or you can spray weeds with 2,4-D from an aerosol can; white pigment marks treated weeds.

Personal Digest has been compiled from American Business, Business Week, Factory Management & Maintenance, and other sources.

DAY and NIGHT around the world . . .

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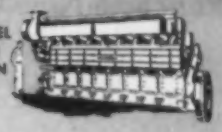
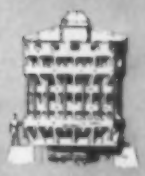
Profitably Serves Basic Industries

For Power and Light . . . for Sailing the Seas . . . for Improving Railway Transportation . . . and for Processing the Earth's Ores and Minerals . . . in *all* of the many industries in which Nordberg Machinery serves, you can be sure that the Nordberg name stands for highest quality—dependability—and efficient operation.

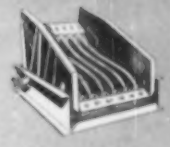
Write for further information on the type of machinery in which you are interested.


NORDBERG DIESEL DUAFUEL® and SPARK-IGNITION GAS ENGINES 10 to over 10,000 H.P.


SYMONS® PRIMARY GYRATORY CRUSHERS

SYMONS CONE CRUSHERS

NORDBERG MINE HOISTS


SYMONS VIBRATING GRIZZLIES AND SCREENS

NORDBERG GRINDING MILLS

NORDBERG RAILWAY MAINTENANCE MACHINERY

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NORDBERG THE WORLD OVER

Dealers in Principal Trading Areas throughout the World

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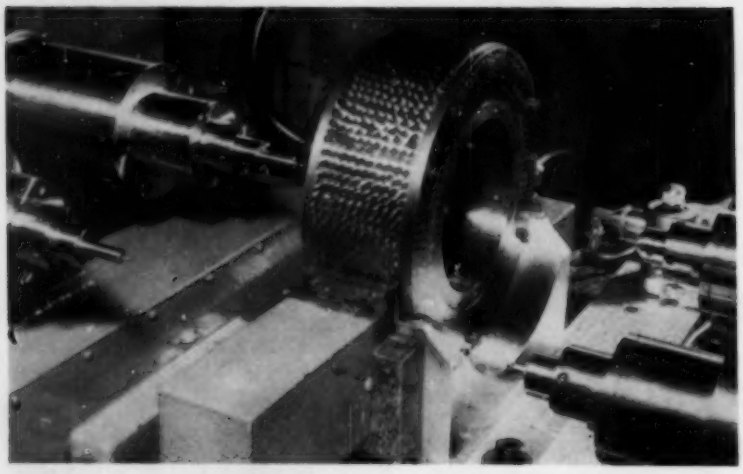
Punched-Tape-Operated Boring Machine . . .

. . . Cuts Gear-Train Production Costs



Digested from American Machinist, Apr 11, p168—Minneapolis-Honeywell Regulator Co. has developed a punched-tape system to convert a standard, four-spindle Ex-Cell-O boring machine to automatic production on instrument-gear trains. Controls and tape reader are in cabinet at left (top photo); operator (foreground) is punching hole coordinates on plastic tape. Electronic signals from tape reader regulate linear travel of cross-slide and rotary motion of holding fixture (bottom photo) for boring of shaft holes in gear plates. Tape-controlled borer is ideally suited for medium-sized production lots. Tooling and setup costs are lower than those for either punch-press piercing dies or drill-ream jigs.

TV-Tube Plant Has Vibration-Free Area

Digested from Factory Management & Maintenance, Apr, p102—Westinghouse Electric Corp. needed a process area for manufacturing television picture tubes. The 6,300-sq. ft. area had this requirement: it could not tolerate the slightest vibration. And this area had to be integrated with the mechanized handling flow to other parts of the plant. Here's what Westinghouse did:

• **First it prepared** the subgrade for the floor. A natural gravel course was tamped and covered with a 6-in. layer of fine sand containing enough clay to produce 90% compaction.

• **A 4-in. concrete floor-slab** was then poured over this subgrade. It was separated from surrounding walls by a preformed, felt-sided, expansion-joint strip.

• **All equipment** was installed so that sole support or contact was obtained either from the walls and ceiling, or from the floor slab. Nowhere was rigid contact made between floor and sidewalls, or ceiling.

• **All rotating equipment** was equipped with direct-current motors.

• **All service connections** were made with vibration-isolation in mind.

China Plant Dries Air

Digested from Ceramic Industry, May, p87—Air conditioning its New Orleans plant has solved American Radiator & Sanitary Corp.'s problem of control of clay casting and drying. Products manufactured are vitreous-china plumbing fixtures.

The high humidity in the New Orleans area made it impossible to establish a uniform drying rate. As this was needed because each mold was to be used once a day, air conditioning was installed to assure overnight mold drying.

The system combines Surface Combustion Corp.'s Kathabar air washers (dehumidifiers) with aftercooling units. The humidity-control units at times remove over 18 tons of water per day from the air supplied to the plant.

Plastic-Glass Tape

Digested from Modern Plastics, May, p230—Minnesota Mining & Mfg. Co. (St. Paul, Minn.) is looking for industrial applications for two new fibrous glass-reinforced polyethylene tapes that may lend themselves to unlimited reinforcing and sealing use.

Both of the Scotch brand reinforced polyethylene tapes, No. 875 (pressure sensitive) and No. 877 (non pressure sensitive, but heat sealable), were developed to reinforce plastic panels of weather balloons that explore the stratosphere. Hundreds of continuous glass filaments reinforce tapes.

Other specific applications known at this time include: (1) edge reinforcement in the woven wire and silk-screen industry and (2) reinforcement for lightweight plastic tarpaulins.

Wood-Treating Compounds Renew Old Technique

Digested from Chemical Engineering, Apr, p126—Wood preservers in the U. S. are pledges to a two-point program: (1) educating the public on potential uses of preserved wood and (2) improving their chemicals and techniques.

One trouble has been its inability to compete with "newer" structural materials — steel, concrete, synthetics. But the belief of wood preservers in their future is emphasized by the expansion in wood-preserving facilities within the last year.

Creosote, the oldest and best-known preservative, accounts for 90% of all wood treated. But its disadvantages — combustibility, unpleasant odor, non-paintability —led to development of other compounds.

Among the better known are pentachlorophenol (the most promising of oil-borne preservatives) and chromated zinc chloride (the most popular of the water-borne preservatives). Among proprietary water-borne compounds in demand are:

- Wolman Salts (Tanalith)—a fluoride-phenol mixture.
- Celcure—a solution of chromates and copper salts.
- Chemonite — an ammoniacal solution of copper and arsenic salts. This is a relative newcomer.
- Boliden Salts—complex chromated zinc arsenate crystals.

Lightweight Materials Allow Building to Expand

Digested from Architectural Record, May, p227—A sandwich-type prefabricated curtain wall was erected on top of New York City's Bellevue Hospital after engineering investigations revealed that the structure could not support a masonry addition.

Masonry construction to satisfy the city's fire code would have to weigh 140 lb. per sq. ft. So architects recommended insulated stainless-steel panels that weigh only 14 lb. per sq. ft. and satisfy the code.

Each panel consists of a sandwich of metal and insulation. Interior faces butt together to form a wall that needs no finishing other than painting.

Additional weight was saved by erecting a light structural framework above what was once the roof, leaving a crawl space under the new floor. Light-gage cold-formed floors with concrete topping complete a lightweight floor.

Solid Tires Cut Costs

Digested from Coal Age, May, p95 —Doubled tire life, higher shuttle-car speeds, and elimination of down-time from tire failures are among operating advantages of new-type tires proved by Princess Elkhorn Coal Co.'s experience.

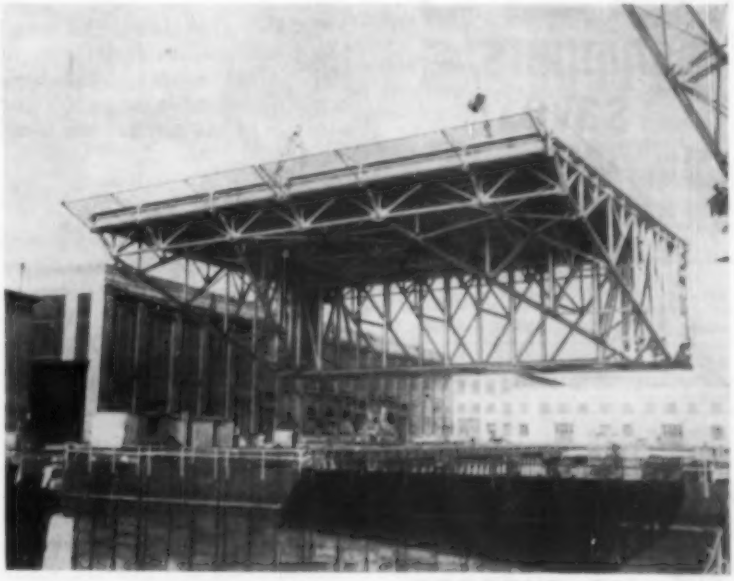
Developed by U. S. Rubber Co., the tires are solid. A tough outer stock provides superior cut, chip and wear resistance. The inner stock is resilient and provides cushioning. The new tires also permit higher-speed operation. Their greater load-carrying ability and small diameter have been definite advantages in low-coal mining.

Process Instrumentation: Biggest Advances Ahead

Digested from Petroleum Processing, Apr, p451—No end is in sight for potential advances in process-control instrumentation, according to J. J. Grebe, nuclear-research director, Dow Chemical Co. He visualizes that in less than 10 years instrument shops may have atomic piles to produce short-lived isotopes as tracers and detectors.

The next step in instrumentation, he feels, is the use of a "digitizer." Already in development, it will transfer spectrometer indication to digital form for the records, simultaneously with spectrometer operation. The digitizer will be hitched to a digital computer to make calculations and then set control devices in the process.

Greatest advances in instrumentation may come through use of resonance principles. From resultant indications, most process conditions — concentration, level, rate of particle acceleration, depth, height, velocity and identification of batch-reaction end—will be deduced.



Welded Aluminum Structures

The use of high tensile aluminum in a huge deck elevator recently completed for the U. S. Navy's new aircraft carrier, Shangri-La, resulted in considerable savings. The elevator is the largest all-aluminum, all-welded structure of its type in America and possibly in the world. All structural members are of aluminum tubing supplied by the Reynolds Metal Co., (Louisville, Ky.). All welding was done by inert-gas metal-arc process.

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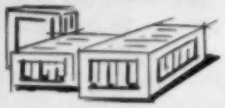

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Aluminum Has a Future

Engineers have learned from experience the need to study alternative material possibilities. Here are results of experiments with aluminum

DIGESTED from Power, May, p76— Over the past several years, aluminum has become increasingly important in industrial applications. Recently, a conference sponsored by the American Institute of Electrical Engineers met to discuss possible applications for aluminum in the field of electricity. Among the points brought out:

Switchgear

In switchgear, aluminum's applications vary from small rivets and hardware to important structural and current-carrying parts, each taking advantage of some of the metal's characteristics.

Limitations include lower conductivity than copper, low annealing temperature, difficult joining problems, and possible galvanic corrosion.

On the other hand, the metal has good machinability, and, in high-current applications, aluminum's nonmagnetic properties find wide use as bus barriers and housings.

Transformers

Copper shortages, during and after the war, led manufacturers to try aluminum as a substitute in transformer windings. These proved satisfactory for both oil-insulated and dry-type distribution transformers.

In full production, however, manufacture of oil-insulated transformers would require complete redesign of core and coil proportions and would also entail changes in factory procedures. Although the end product would be fully equal in performance, such a change will not be made until cost ratio or material availability makes it economical or advisable to do so.

Dry-type transformers require larger coils and a bigger core, but as air is the principal insulator, a small increase in size of core and coils adds only slightly to insulation cost.

Such transformers with aluminum windings have been in successful service for 3 to 4 years. But over-all costs are about a third higher than equivalent copper transformers; this will make full adoption unlikely except in the case of a copper shortage.

Distribution

For distribution purposes, experiences of three companies show that aluminum performs satisfactorily, particularly in light-load areas. Material and construction costs are less than for copper conductors, but there have been certain difficulties.

Among the problems encountered: conductors burned down at connections; lights flickering because of loose connections; equipment damaged by unbalanced voltage caused by an open or poor connection in a secondary material.

Comparing a steel-reinforced aluminum conductor, with an all-aluminum conductor of the same capacity reveals that all-aluminum is justified not only for first cost of the conductor itself, but also for cost of material, labor, fittings, and installation.

Rotating Machines

Aluminum's properties make it especially useful for rotating machines, whether fractional-horsepower motors or large turbine generators.

In nonelectric applications, aluminum alloy has been used for generator terminal plates, coil slot wedges, cooling fans for hydrogen-cooled units, and doors and panels on lagging and housing.

Silicon Rectifiers for A-C. Line Operation

Digested from Electronics, Apr, p146—New silicon rectifiers developed by Transitron Electronic Corp. (Melrose, Mass.) handle useful power levels at 125°C. and, with further development, will be capable of operating at 200°C. Other silicon rectifiers, not yet in quantity production, can operate at currents of hundreds of amperes or at voltages up to several thousand volts.

Heart of the new rectifier is a wafer of single-crystal silicon less than ½ in. square, having contacts fused to either side. One side of the silicon wafer has a fused aluminum contact. This provides the semiconducting barrier that determines the properties of this junction rectifier.

A soldered contact is made to the other side of the silicon wafer, the sandwich is soldered to a copper base, and an anode lead is attached to the aluminum. The whole unit is hermetically sealed. In addition to serving as the cathode connection, the copper base conducts heat away from the rectifier.

Training for Business

Digested from Harvard Business Review, May-June, p42—Business executives are being faced with an increasing need for general knowledge, intellectual subtlety, political insight, and human flexibility. And this means that they must have an educational background that promotes these traits.

One top U.S. businessman, discussing executive requirements, refers to the need for "breadth of judgement" and cites a problem that commonly arises from specialized training: ". . . narrowness of view . . . judgement of all events by the peculiar standards of his own specialty, is the curse of the specialist from the standpoint of top-management consideration for advancement."

Much of the answer, experts feel, lies in education. There is reason to believe that colleges and universities might do well to reappraise their courses of study in light of business requirements.

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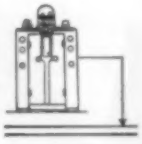

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Moving Source Makes Radiation Therapy Safer

Digested from Control Engineering, May, p78—"Teletherapy" pertains to the treatment of disease with emanations from radioactive substances such as cobalt-60 and cesium-137. Benefits of these rays are limited because healthy tissues can be injured by overexposure. It is almost impossible to irradiate a tumor without irradiating healthy tissues.

In moving-beam therapy, the angle of the beam changes constantly during treatment, while the tumor remains at the "focal point" or center of rotation. A machine at the Medical Division of Oak Ridge Institute of Nuclear Studies controls movement of a radioactive source of gamma rays over a spherical locus. The rays are directed through a target point fixed in space at the center of curvature of the locus surface—the center if the locus is a sphere. The radius of the locus is adjustable to permit variation in source-to-target distance.

The machine provides four basic motions: radioactive-source tilt, vertical, horizontal and azimuth motions about a vertical axis. Any motion desired may be had by coordinating the basic motions.

Boosts Concrete Quality

Digested from Construction Methods & Equipment, Apr, p83—Revibrating concrete just before it reaches its initial set can produce many benefits. It makes concrete stronger, denser, more uniform. Although revibration is effective in ordinary concrete, it performs even better when the set is retarded.

Here's a sample: Tower spandrel beams on the New York Thruway's Tappan Zee Bridge were poured in four 3-ft. lifts. To prevent cracking in the bottom surface as concrete is placed in higher lifts, the entire mass was kept fluid with a retarder. The full depth was then revibrated.

By assuring adequate time for revibration, the retarded concrete yielded a substantial gain both in uniformity and in 28-day compressive strength.

Hydrazine Successful in Treating Feedwater

Digested from Chemical Engineering, May, p122—Hydrazine's use to treat boiler feedwater seems headed for lusty growth. A year ago, only eight steam plants were using hydrazine; more than 20 utilities have now adopted it to scavenge oxygen from feedwater.

Two trends are paving the way for hydrazine's acceptance: (1) rising boiler pressures intensify the need for chemicals to aid mechanical deaeration; (2) falling prices—from $9 per lb. for hydrazine in 1949 to $1.50 now.

Performance of hydrazine in this price range is good enough to compensate for its price differential with sodium sulfite. One pound is equivalent to 20 to 30 lb. of sodium sulfite (at 11¢ per lb.).

Hydrazine is more stable than the sulfite at high temperatures. Even if it should break down, it liberates no corrosive acid products, and it adds no solids.

Olin Mathieson Chemical Corp., top producer of hydrazine, is trying it in low-pressure boilers (less than 900 lb. per sq. in.). Reports on three 650-lb.-per-sq.-in. boilers indicate negligible corrosion and oxide pitting after 3,500 hr. of continuous service with hydrazine-treated feedwater.

Infrared Warms Feet

Digested from Electrical West, Apr, p78—Cold feet were keeping spectators away from a Los Angeles skating rink until the city Department of Water and Power provided a solution.

To offset the cold air blanket that hugged the floor, four 1,250-watt Corona-Merco Pyrex tube heaters backed by reflectors were mounted in a continuous line over the lounges, and, for the comfort of the receptionist, an Electro Mat foot warming pad was installed under the reception desk.

Not only are spectators now completely comfortable, but also the controlled heat has no effect on the ice in the skating rink.

Industrial applications could be devised in cases where low-temperature working conditions are required.

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Digested from American Machinist, May 9—

► **Broaching** internal gear teeth holds close tolerances at Rochester Gear Works—involute profile area within ±0.00025 in., spacing within 0.0005 in., lead error within 0.0003 in. Broach, made by National Broach & Machine Co. (Detroit), is 72 in. long, has buttons following gear-finishing teeth to broach inside diameter truly concentric with pitch diameter.—p158

► **New die technique** cuts as much as three-fourths off forging lead times. Developed at North American Aviation, Inc.'s plant in Columbus, Ohio, it casts stable forging dies from beryllium copper and other casting alloys. Usual lead time of 3 to 6 months is cut to as little as 3 to 6 weeks.—p181

► **Automobile valves** that last up to five times as long as standard valves are being made by Thompson Products Inc. (Cleveland) at a rate of several thousand per hour. They are aluminized by preheating, spraying aluminum on valve heads, fluxing and bonding by salt-bath immersion. Process is known as Alspray.—p185

Multi-Use Steel Panels

Digested from Engineering News-Record, May 12, p62—Newly-developed steel panels combine the functions of pan forms, acoustic treatment, and fluorescent lighting troffers. Panels are 24 in. wide and are designed for long-span applications.

The acoustical panel is perforated and lined with a non-combustible element that deadens sound. The troffer panel provides a housing for low-cost fluorescent fixtures and plastic diffusers to provide recessed lighting with a flush ceiling.

As forms for concrete, the panels need support only at midspan and ends. Thus much material and labor that are needed for the usual types of shoring systems are saved.

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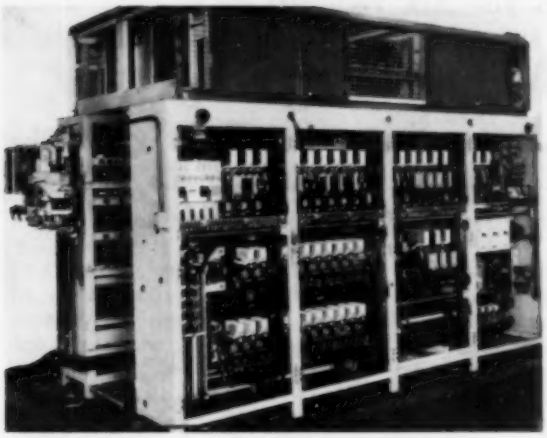


CONTROL UNIT of new General Electric locomotive has two control cabinets with accelerating resistors and blower mounted above. Both ac. and dc. provide power as . . .

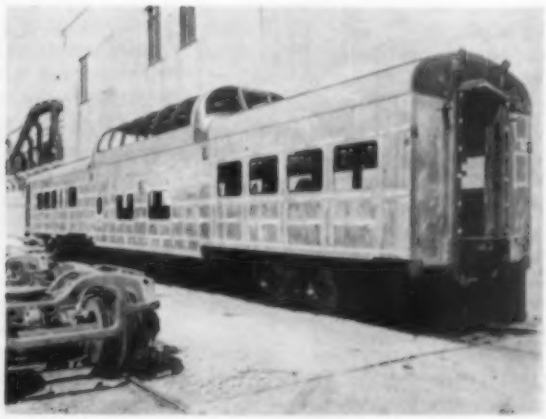
. . . LOCOMOTIVE makes its normal passenger run. This particular locomotive must carry train-heating equipment but cannot exceed an axle load limit of 58,000 lb.

Trends In Railroading

Increased competition from airlines, bus lines, and private cars has forced railroads in the U. S. to modernize and improve their passenger service. Here is some of the most recent equipment designed to attract passengers to ride the rails again instead of the highways and airways.—Digested from Railway Age, April 11

SPECIAL DOME CARS to provide maximum passenger visibility have been built by ACF Industries, Inc., for the Union Pacific. Dome has a high-tensile steel frame.

AN INTERIOR PHOTO of dome car shows its three levels. Passageway leads to cocktail lounge; stairway leads to the dome section, which has divan-type seating.



SIDE SHEATHING, side plate, belt rail, and side posts, except those over jacking pads, are aluminum alloy. Main end, door end, and observation end corner posts are steel.

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Electronic Meter Spots Faulty Metal Bonds

Digested from Aviation Week, Apr 4, p56—Adhesive-bonded metal components can now be checked with electronic meters that not only detect faulty bonds but also diagnose the trouble. Both units use mechanical impedance principles, and the degree of vibration tells the story.

The device, called STUB meters (Stanford Testing Ultrasonic Bond), are based on a Stanford Research Institute development.

The inspector spreads a thin oil film on the panel to be tested. He then runs a ceramic crystal over the panel's surface. The crystal is excited by means of a high-frequency oscillator at a resonant frequency of 400,000 cps., the test section vibrating at the frequency of the crystal.

Electrical properties of the crystal permit it to receive and transmit electrical energy. Amplitude response is shown on an oscilloscope. The better the bond, the less the vibration.

How Often Do You Ask Yourself: Do I . . .

Need More Engineers?

Maybe the answer is that you do. But maybe you need to use your present engineers more efficiently. The result, in effect: more engineers

DIGESTED from Petroleum Processing, May, p647—Shortage of engineers is by no means confined to the U.S. It's world-wide. And it's especially severe in all the under-industrialized countries that are trying to develop more rapidly.

You can ease your shortage without increasing your staff. It's not magic, but simply a matter of sharpening up your operations so as to give your engineers either more help or less work that is not strictly of engineering character. Most ideas for improving better use of engineers fall into three catagories:

1. Give them supporting personnel. This is the most familiar method—to use non-technical workers to do technical work.

Standard Oil of New Jersey, at its Bayway refinery, has used non-technical personnel for some years to assist chemists in laboratories. Other jobs they do include tank gaging and sampling in conjunction with plant tests, regular checking of heat exchanger and furnace performance, product costing, and yield predictions.

Accounting personnel were assigned to the latter two jobs. Their knowledge has increased to a point where they now can make decisions of a truly engineering nature within their job areas. Men with degrees in business administration or general economics contribute in the refinery's process economics work.

Probably the most common way to stretch engineers' work load is to fill drafting jobs with non-technical personnel rather than engineers. You can find suitable men in your own plant, or you can get them from high schools or technical schools.

2. Organize for efficiency. More efficient procedures in your engineering organization can work wonders.

Indoctrination programs can help in bringing new engineers up to their maximum usefulness. At Texas Co., the program depends on the kind of work. At one research laboratory, personnel receive a 6-month course that includes time spent in refinery activities. They see what is done with the crude oil and its subsequent components and intermediates from tank farm to tank car.

Several efficiency-minded companies have singled out the engineering supervisor for special treatment. One is experimenting with consulting psychologists to determine its engineers' aptitude for supervisory work. Another is having its management group take special courses in administrative work at Harvard University.

Continental Oil Co. stresses the supervisor by giving him clear-cut authority and responsibility. Men with similar jobs are put into groups with a senior engineer assigned as supervisor. His job is to organize the work of his men, train men new to his group, handle personnel problems.

Some companies have approached better utilization of engineers through innovations in organization. A "pre-planning" section can provide close coordination of participating units at every stage and cut wasted man-hours from inaccurate or incomplete plans.

3. Modernize engineers' tools. It makes little sense to pay engineers high salaries, then to reduce their efficiency by not providing them the modern tools they should have.

In the petroleum industry, for example, the new technique of high-speed electronic computers is finding ready use.

Don't overlook the simpler measures. Old typewriters, calculators and adding machines and poor stenographic services can deprive your company of an easy increase in engineering productivity.

Quest for Purity

. . . makes metal serve as its own crucible. The process is a development in zone refining

DIGESTED from Business Week, May 7, p106—Even minute amounts of impurities in metals can have disastrous effects. Germanium, used in transistors, is notably touchy. One part of impurity can make 10-billion parts of germanium useless.

Removing impurities is difficult, however. While it is known that if one end of a metal bar is melted it will come up with more than its share of impurities, melting sections of a bar to attract impurities from the rest of the bar is not so easy as it might appear. The reason: when metals such as germanium are melted, the temperatures required are so high that the metal picks up still more impurities from its crucible.

To offset this, Westinghouse Electric Corp. has experimented with a process that makes the metal its own crucible. A cylinder is machined so that fins ¼ in. apart run the length of the cylinder. The cylinder is then placed inside an electrical coil so that it can move up and down, bringing the coil to bear on any part of it.

High-frequency current is passed through the coil, inducing a current inside the cylinder that heats the metal to the melting point. After a small cross-section of the cylinder has been heated, the entire piece is moved so that the current is brought to bear on another part. Thus, the molten zone finally collects the impurities from the entire cylinder.

The trick lies in the fact that the coil heats only the interior of the cylinder to the melting point, and the heat is dispersed by the fins. In this way, the metal's exterior serves as the crucible for its own interior.

By manipulation, impurities are finally concentrated at one end of the cylinder and then cut off.

While the process is effective, it will require considerable work before it becomes practical for full-scale production.

International Business Briefs

TOKYO—The Japanese Ministry of International Trade and Industry has announced foreign-currency allocations of $92-million for the import of raw cotton and beef tallow. The import figure for beef tallow has been set at $12-million to be disbursed from the country's "global sterling accounts".

It is also reported that Japan may begin negotiations with the Italian government for a treaty of commerce and navigation. The pact would cover protection of investments, business activities, and control of foreign exchange among other matters.

MEXICO CITY—To keep pace with the country's accelerated industrialization, the country's two leading electric-power companies plan major expansion involving at least $240-million. The two companies are: Cia. Mexicana de Luz y Fuerza Motriz, S. A. and Cia. Impulsora de Empresas Electricas, S. A.

The latter company will invest $40-million over the next 5 years in thermal steam-operated power stations.

AMMAN—The Jordan government has ratified a draft law encouraging the investment of foreign capital. The establishment of this capital in economic schemes will be under the supervision of the country's Ministry of Economy.

Under the draft law, foreign investors would be exempt from income tax on their profits for the first 5 years.

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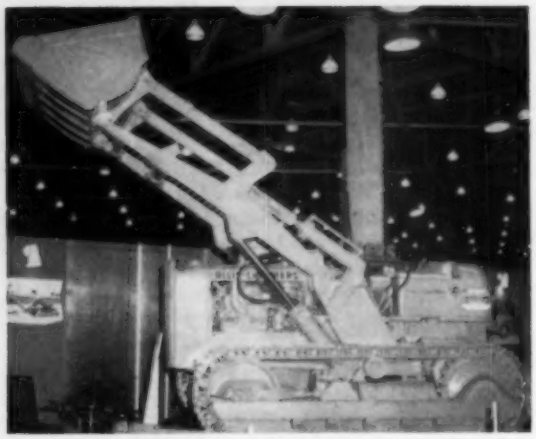
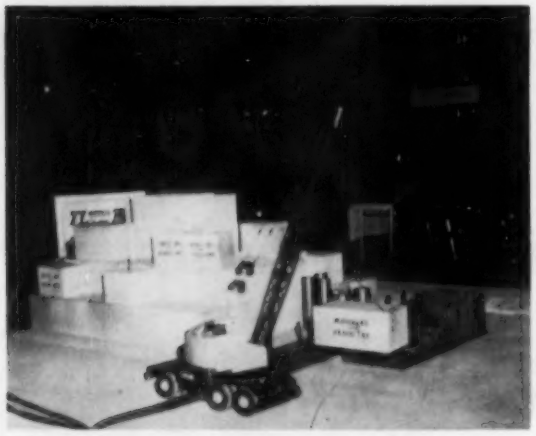
One Wall Street, New York 5, N. Y.

RAPIDS-STANDARD, showed among its complete line of conveyors, this heavy-duty turntable. A revolving plate transfers packages from roller conveyor to belt conveyor.



ALLIS-CHALMERS HD-5G tractor shovel is equipped with bucket. Other attachments include crane hook, lift-fork, tine fork, and rock bucket to handle variety of jobs.



THEW SHOVEL demonstrated crane handling in a miniature plant yard with this model and also showed by television a crane operating 2 miles from the hall.

DAVE FISCHBEIN WESTHEM SALES portable bag closer weighs only 10½ lb. It reduces handling of full bags, saves time in closing both cloth and paper bags.

FRANK G. HOUGH model HH Payloader is a 1¼-cu. yd. tractor shovel with 40° bucket break-out and tip-back at ground level. Other attachments are available.

BARRETT-CRAVENS Guide-O-Matic is a tractor that has no operator. It's guided by radio waves from a wire overhead. Tractor is "called" by a signal-box system.

. . . the Show's Theme—"The Concept of Obsolescence"

RADIO CORP. OF AMERICA demonstrated two-way radio communication between driver and dispatcher. Advantages are faster handling, fewer delays.

INTERNATIONAL HARVESTER Drott TD-6 skid-shovel is actually four machines in one. Selector transforms it to bulliclam, clamshell, skid-shovel, or bulldozer.

Mechanizing Your Handling

. . . and keeping the equipment up to date can assure the benefits of lower-cost production, better-quality products, less worker fatigue

TEN MILLION DOLLARS worth of materials-handling equipment told their story—that new developments in the industry are obsoleting older equipment, that handling techniques can quickly become inefficient in today's fast-moving industrial pace.

That was the story told at the recent National Materials Handling Exposition held in Chicago late in May. Managing executives and materials-handling engineers from many countries looked and listened.

They saw cranes and shovels, conveyor equipment of all kinds, electric and gas industrial trucks, hand trucks, hoists, packaging equipment, floor-cleaning machines, railroad cars, racks, pallets, and many other types of related equipment.

Outstanding among the exhibits that attracted crowds was the Guide-O-Matic, a Barrett-Cravens tractor that needs no operator. It follows a route set by a guide wire strung from the ceiling. Completely automatic, it makes no physical contact with the guide wire. An electronic "sniffer" on the tractor picks up radio waves from the wire that are transmitted by means of signal boxes installed at desired locations throughout a plant.

Another crowd attraction was at the Thew Shovel Co. booth. A crane, too large for the hall, was set up 2 miles away. Booth visitors viewed the machine through closed-circuit television and directed the intricate maneuvers by two-way radio. Other crane and shovel exhibits included Austin-Western's highly flexible indoor-outdoor hydraulic crane, Schield Bantam's new 6-ton self-propelled shovel-crane, Allis-Chalmers' HD-5G tractor shovel, Dixie Crane & Shovel's new 6-ton crane, Bay City's 15-ton Cranemobile, Link-Belt Speeder's 15-ton hydraulically controlled utility crane.

Among the wide varieties of conveyors were Rapids-Standard's roller and belt conveyors along with its new heavy-duty, revolving-plate turntable. Lamson Corp. demonstrated a pre-engineered "Install-Your-Own" conveyor system; components available are wheel, roller, and belt conveyor sections, unit boosters, curves, drivers, and supports.

Held concurrently with the exposition, a three-day conference of the American Materials Handling Society covered the broad aspects of the industry. A nine-point check list of factors that cause obsolescence was presented by J. D. Sheahan, consultant. He advised that methods be evaluated whenever changes occur in:

1. Characteristics of customers' orders. The trend is toward smaller, more frequent orders.
2. Product lines. Diversification adds to storage and handling.
3. Merchandising policies. Sales promotion can create new demand patterns.
4. Inventory policies. Any change affects materials flow.
5. Manufacturing policies. Changes must be matched by new handling provisions.
6. Availability of new types of raw materials.
7. Facilities. Cheaper handling may justify new construction.
8. Transportation. Packaging may depend on the carrier.
9. Availability of new types of handling equipment. They may make new methods practical and economical.

For more on materials handling, turn the page.

More Modern Materials-Handling Equipment Seen at the Show

LINK-BELT SPEEDER model UC-68 is a 15-ton, self-propelled utility crane. It works equally well with crane, clamshell, dragline, magnet, shovel or hoe attachment.

TOLEDO SCALE Automatic Carton Classifier checks container weight against predetermined standard. Photo-cell controls are set to the limit weights on the dial.

CATERPILLAR TRACTOR HT4 Traxcavator, shown here handling lumber, is equipped with lift fork. Also on display was a 1¼-cu. yd. bucket for this machine.

G. H. TENNANT model 75 power sweeper can sweep up to 100,000 sq. ft. per hr. A 60-in. turning radius enables quick maneuvering on plant floors.

SCHIELD BANTAM model CR-35 is a 6-ton shovel-crane. Self-propelled, it is highly maneuverable with an outside turning radius of only 19½ ft. Top speed is 5½ mph.

AUSTIN-WESTERN hydraulic crane fills many handling needs both indoors and outdoors. Highly versatile, it combines features of crawler, truck, and shop cranes.

lead scraps, filled drums of lead

THREE MEN unload 800 bags of flour in 18 man-hr., replacing five men formerly required to unload flour in 33 man-hr. Pallets are lifted into car as needed.

SIDE-SHIFTING Load-Grab handles load of pig lead by closing firmly on the bottom layer with sidewise pressure. Hydraulic mechanism supplies the side squeeze needed.

Handling-Cost Case Studies

You can cut your handling costs. Believing that is the first step. The next—study and imagination to show how.—An original Digest article

MATERIALS HANDLING, even after the significant improvements made in techniques and equipment in recent years, still remains as probably the greatest single source of potential cost cutting in production processes and distribution practices. To indicate how these improvements can be applied in your factory or warehouse or even port, the following case studies on industrial-truck use have been selected from a variety of industries.

• **Bakery**—High wages, breakage, and lost time have been costly problems in intraplant movement of bakery goods. But bakery managers, now aware of potential savings from better handling, are studying their operations to see how and where new handling techniques can help.

What can be done is shown by results at the Salerno-Megowen Biscuit Co. of Chicago, one of the world's largest bakeries:

• Cutting freight-car unloading time by almost 50%.

• Increasing storage space by 33%.

• Reducing man-hours for unloading trailers by 66%.

• Transferring five men, without replacement, from the warehouse crew to other jobs in the bakery.

• Improving cleanliness and sanitation in the warehouse.

Salerno-Megowen gained these amazing benefits by making a thorough study of its operations and handling needs, equating the needs to plant facilities and layout, then deciding on a palletizing system. The program is based on four 2,000-lb. electric Clark Clipper fork trucks and three Clark Powrworkers (powered hand trucks).

The fork trucks are spotted in the plant where they are needed the most—where heavy loads are to be moved, where materials have to be moved quickly, or where too many laborers had to work in crowded quarters.

In unloading 100-lb. sacks of flour from freight cars, five men were required in the previous system. Two men lifted sacks from car to chute, two men transferred sacks from chute to skid, one man hauled loaded skids away. Unloading an 800-bag car took 33 man-hr.

In the new system, two men load pallets in the car, one man moves loaded pallets to storage. As the car is unloaded and the distance to the pallet lengthens, a power hand truck is lifted into the car to move pallets to the doorway. Unloading time is 18 man-hr., slightly more than half previously required.

Finished bakery goods also are handled by truck—an unusual operation because of the light, fragile boxes. But a lightweight (35-lb.) pallet, with a plywood deck and three braces, permits tiering packaged goods to 10 ft.

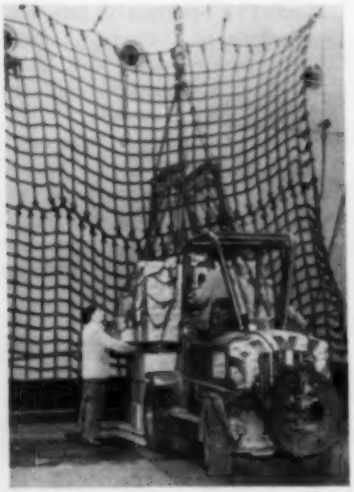
• **Pigment Manufacturer**—National Lead Co. at its Brooklyn plant has realized considerable savings in time and effort plus a safer operation from modern materials-handling methods. Handling raw materials of various sizes and shapes required a versatile handling unit. Selected were two Hyster 4,000-lb. fork lift trucks equipped with Load-Grabs.

The Load-Grabs side-squeeze the load, as compared to the conventional method of stacking and transporting of materials on pallets. Hydraulic pressure exerts the side force on either the pallet or four-drum handling arms.

Materials handled by the Load-Grabs include skip loads of white-

TRACTOR-AND-TRAILER SYSTEM helped modernize handling at Port of Callao, Peru. Trailers now move palletized cargo from ship to warehouse.

FORK TRUCKS with self-dumping hoppers are saving $9,000 a year in labor costs alone in handling scrap at Westinghouse plant.



CARGO HANDLING at New York pier has been so speeded up by fork trucks and special pallets that ship turn-around time has been slashed sharply.

lead scraps, filled drums of lead oxide and other chemicals, and piled loads of lead pigs. Pallet-type forks grip the bottom layer of pigs, thus supporting the whole load for stacking or transporting to the furnace room.

A typical application at National Lead: Previous method of moving drums of lead oxide from filling room to shipping dock was by low-bed trailer towed by a platform truck to an elevator, then lifting by elevator, after the usual delay, to the shipping-floor level. A fork truck now lifts drums from the yard to the shipping dock with no delays.

• **Callao, Peru**—The port of Callao has modernized its materials-handling operations at a cost of nearly $1-million. The result: congested cargo conditions eliminated, handling costs reduced, 25% surcharge on discharged freight removed.

Before modernization, cargo handling equipment consisted of a 45-ton heavy lift crane, a 25-ton traveling crane, a 15-ton floating crane, eight 1-ton mobile cranes, and a narrow-gage railroad. But congestion was so bad that ships had to lay over 4 to 5 days in port. As shippers insisted on immediate unloading to reduce layover time, cargo had to be handled twice—first, sorting cargo into lighters and then moving it into warehouses the next morning.

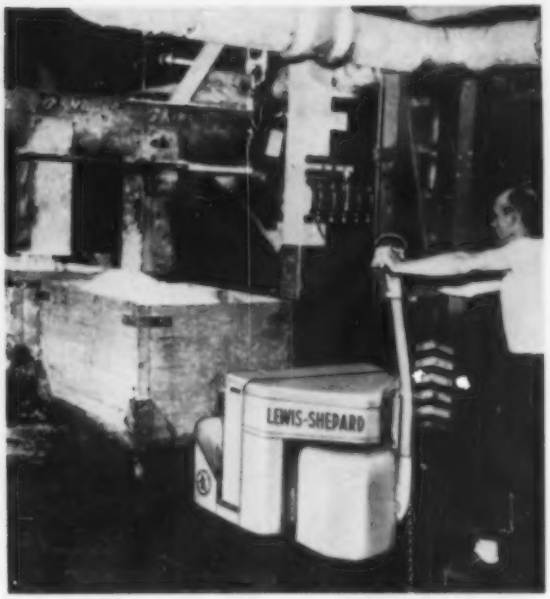
In warehouses, all material was stacked on floors. Stock records were poor. Sorting and assembling orders for redistribution often took 2 to 3 weeks.

At dockside, the principal equipment was the railroad that moved cargo from ships to warehouses. Switching of cars wasted a lot of unloading time.

The new system adopted handles materials by fork lift trucks, tractors, trailers, straddle trucks, cranes, and roller conveyors. Ten-thousand pallets were bought. Piers, warehouses, roadways were improved. A new accounting system keeps track of all cargo from receipt to delivery.

Loaded pallets are moved from ship to warehouse on Mercury "Trackless Trains." The tractor-and-trailer combination, replacing the railroad, wastes no ship unloading time. Loaded trailers,

FLOUR MILL—J. Allen Smith Co. (Knoxville, Tenn.) has mechanized its bag handling, a big job in a mill processing 250,000 lb. of feed and 520,000 lb. of flour in 24 hr. Three Elwell-Parker 4,000-lb. fork trucks, equipped with pallet retriever attachments, have cut handling costs 30%, reduced manpower force from 60 to 42 men, added storage space, thereby avoiding construction of an extra building.



PAPER MILL—S. D. Warren Co. (Maine) was faced with high handling costs and the physical disadvantages of insufficient floor strength in available storage areas and low head room. Initial investment of $52,000 in Lewis-Shepard fork trucks and tractors was repaid by savings in less than 6 months—each year's savings now amount to $140,000. Tractors have proved highly flexible units.

with loads up to 30 tons, are hauled to warehouses and unloaded by fork truck as the tractor picks up a string of empty trailers.

• **Foundry**—Every year Westinghouse Electric Corp. at its East Pittsburgh Works is saving $57,500 through better handling methods. This saving about equals the original cost of the 15 fork trucks doing the handling job.

Westinghouse figures it saves:

1. $12,000 on handling of finished products in the foundry.
2. $17,000 on handling in the lumber yard.
3. $12,000 in warehousing of raw materials for the foundry.
4. $9,000 in handling scrap.
5. $7,500 by palletizing castings in storage yard.

Added to these substantial savings is another important benefit —the 100% effective increase in storage space in warehouse, lumber yard, and outside drum-storage area.

Drums were once **unloaded by** hand from railroad cars and stacked two high. A special pallet now permits carrying drums by fork truck and stacking four high.

In the warehouse, bagged materials were piled by two men. But palletizing lets one man with a fork truck handle the job and stack twice as high, faster, and with less danger of toppling stacks.

Lumber once was unloaded and stacked piece-by-piece, then removed the same way. The present method is to strap lumber into unit loads for efficient handling by large fork trucks.

Metal scrap, always a problem, was once placed in cans next to machine tools. When cans were full, they were loaded by bridge cranes onto platform trucks or trailers. Two men were needed—one to hook the crane chain, the other to empty cans into railroad cars.

Fork trucks with self-dumping hoppers now handle all scrap. Besides labor savings alone of $9,000 per year, truck handling releases bridge cranes to work more suited to their capacities.

• **Pier Handling**—Fork trucks, in combination with the usual winches and booms, have greatly eased and speeded the time-consuming job of loading ocean liners for the Panama Line at its New York pier. Ship turn-around time has been cut, and cargo handling carried out with little breakage.

The stevedore receives materials at trucking docks and immediately places them on special pallets that can accommodate loading slings. Fork lift trucks, of 6,000-lb. capacity, move loaded pallets to pier storage or directly to shipside.

When loaded pallets are moved to shipside, slings fitted with two wooden bars that slip into open edges of the pallet are put in place by longshoremen. The load is then lifted and lowered into the hold. Pallets are there unloaded and, at regular intervals, are returned to the dock for reuse.

Eighteen fork trucks serve the pier. Ships that will load out approximately 3,000 tons of cargo arrive twice weekly. Use of the fork trucks makes it possible to load them fully in slightly more than two single working shifts.

One other major benefit has been gained from the fork-truck system. Their ability to carry double pallet loads and to stack to three or four pallet heights has more than doubled the capacity of the shipping warehouse.

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FINANCIAL DIGEST

MERCHANDISING OF SECURITIES in the U.S. will grow steadily. Both brokers and issuing companies are anxious to achieve more widespread ownership of stocks and bonds.

Latest effort in this direction has been made by the brokerage firm of Merrill Lynch, Pierce, Fenner & Beane. Working from the theory that their job is largely educational, they have persuaded eight major companies to participate in a "How to Invest" show.

No effort is made in this case to sell securities. Rather, the public is given an opportunity to become more familiar with a few of the companies in which it can invest. Prospective buyers are told which criteria to look for in evaluating a company.

In order to attract rural investors, Merrill Lynch also has traveling buses fully equipped as mobile brokerage offices.

✦ ✦ ✦

STOCK PURCHASE BY EMPLOYEES of large companies will also encourage stock ownership, frequently by options at low rates.

In effect, stock purchase plans will be similar to incentive plans. And it is on this basis that they will be most bitterly fought by labor unions, since obviously stock ownership by employees will materially reduce the threat of strikes.

The offer by Ford Motor Co. earlier this year is an excellent case in point. As a counter proposal to the union's demand for a guaranteed annual wage, Ford offered to set up an investment fund. An employee could invest in the fund to the extent of 10% of his gross annual wage. Ford would have contributed an amount equal to 50% of each member's investment. This would be equivalent to giving the employee Ford stock at half price.

✦ ✦ ✦

EASIER ACCESS TO U.S. CAPITAL will result from the restoration of American depositary receipts. The move is almost certain to broaden U.S. interest in foreign stocks.

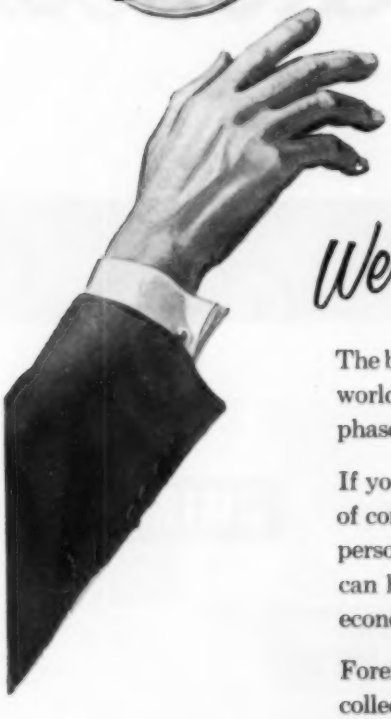
Depositary receipts, which were revived by the Irving Trust Co. in New York, are simply documents issued by a commercial bank's trust department against stipulated securities deposited with an agent of that bank abroad. They are, in effect, "substitution" certificates designed to give the American investor a substitute for foreign shares. The Irving Trust offers these facilities for one Dutch, one South African, and 34 British companies.

Where specific conditions warrant, this and similar services offered by other institutions will probably be expanded. At such time as convertibility of currencies becomes a reality, it is possible that the same facilities in reverse will be offered to foreign investors in U.S. stocks.

✦ ✦ ✦

A GLOSSARY OF FINANCIAL TERMS commonly used in the U.S. has been published by McGraw-Hill's *Business Week*. A few examples: **Blue Chip**—a leading, active, well seasoned issue of stock with a good long-term dividend record and strong investment possibilities. **Ex-Dividend**—when a stock is sold ex-dividend, the seller retains the right to a pending dividend. Price is adjusted to this factor. **Major Trend**—an underlying price trend that exists in the stock market despite occasional contra-movements. **Overbought**—a weak technical position of the stock market, brought about by rising prices, too much speculation. **Penny Stock**—a stock that sells for less than $1 per share.

Financial Digest, compiled from various sources, analyzes current financial trends and underlying factors.



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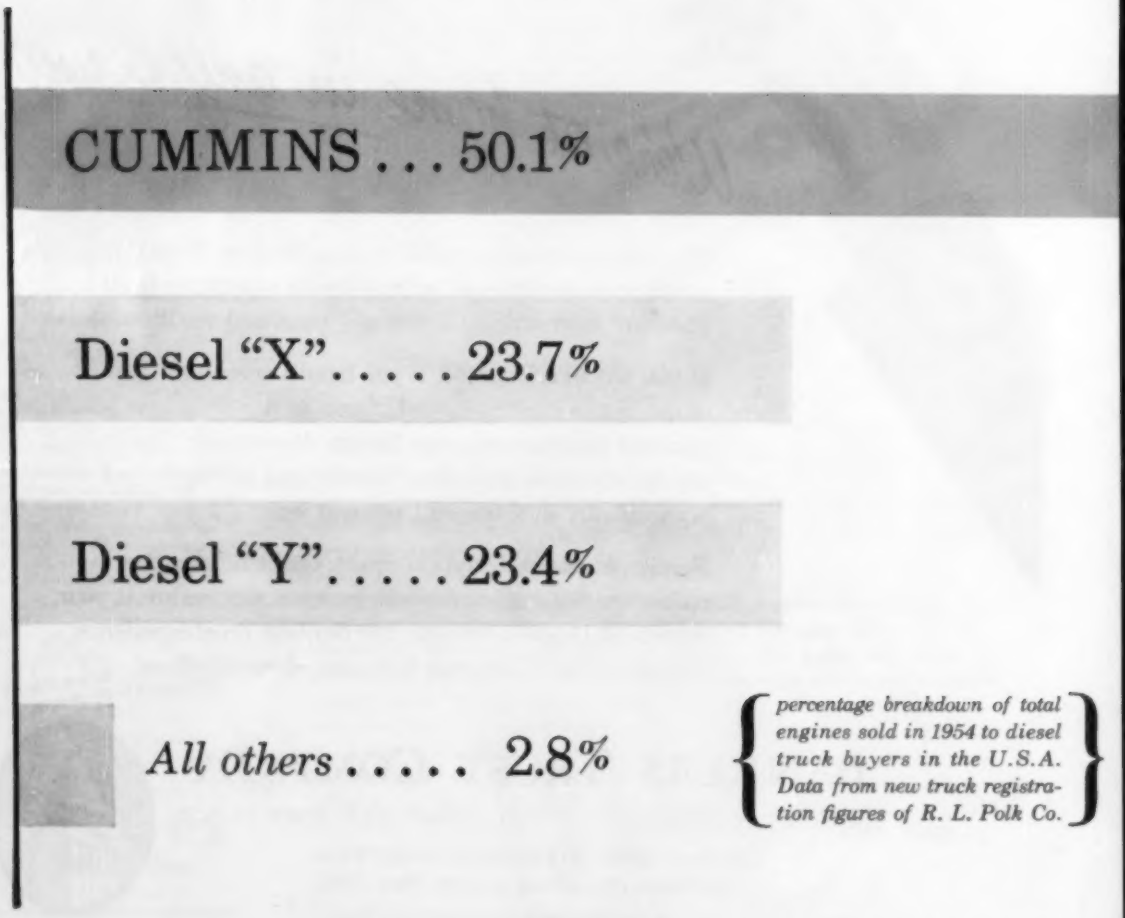
Cummins Diesels more new trucks makes of



{ percentage breakdown of total engines sold in 1954 to diesel truck buyers in the U.S.A. Data from new truck registration figures of R. L. Polk Co. }

power than all other diesels combined!

In 1954, for the third straight year, Cummins Diesels powered over half of all diesel trucks sold in the U.S.A. Year after year, more and more truckers agree that Cummins is the best engine money can buy!

Here are a few of the Cummins exclusive features: unmatched fuel economy; simplified fuel system; low engine weight per horsepower; high mileage between overhauls. Because of such advantages, gasoline truck operators are switching to Cummins Diesels in record numbers.

When you specify Cummins, you *know* you're getting the most advanced diesel research, design, and engineering. Genuine Cummins parts and factory-type service are available from Cummins world-wide distribution organization.

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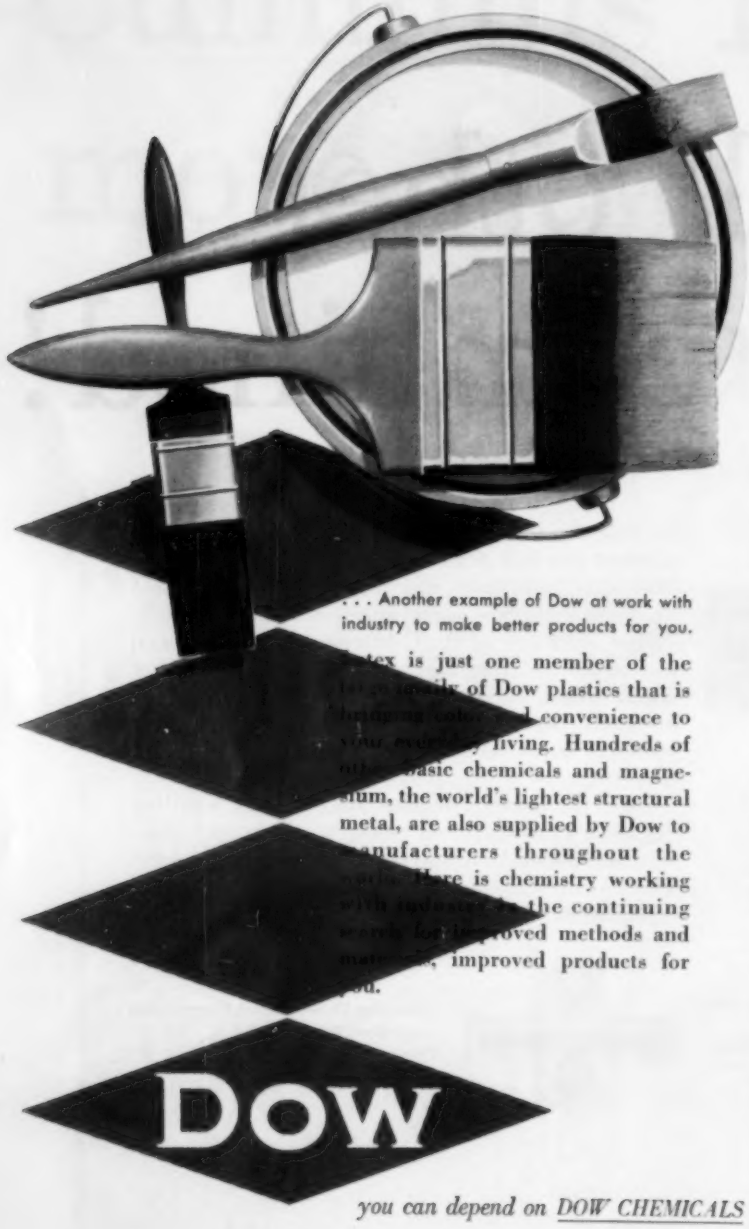

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Latex is just one member of the [illegible] of Dow plastics that is [illegible] convenience to [illegible] living. Hundreds of [illegible] basic chemicals and magnesium, the world's lightest structural metal, are also supplied by Dow to manufacturers throughout the [illegible]. Here is chemistry working with [illegible] the continuing [illegible] for improved methods and [illegible], improved products for you.

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Machines for People

Research in anatomy, physiology, and psychology needs wider use in machine design

DIGESTED from Metalworking Production, Apr 22, p733—All too often machines appear to have been designed for giants or dwarfs or people with five hands. That is what one speaker claimed at a recent conference organized by British Medical Research Council and the Department of Scientific and Industrial Research.

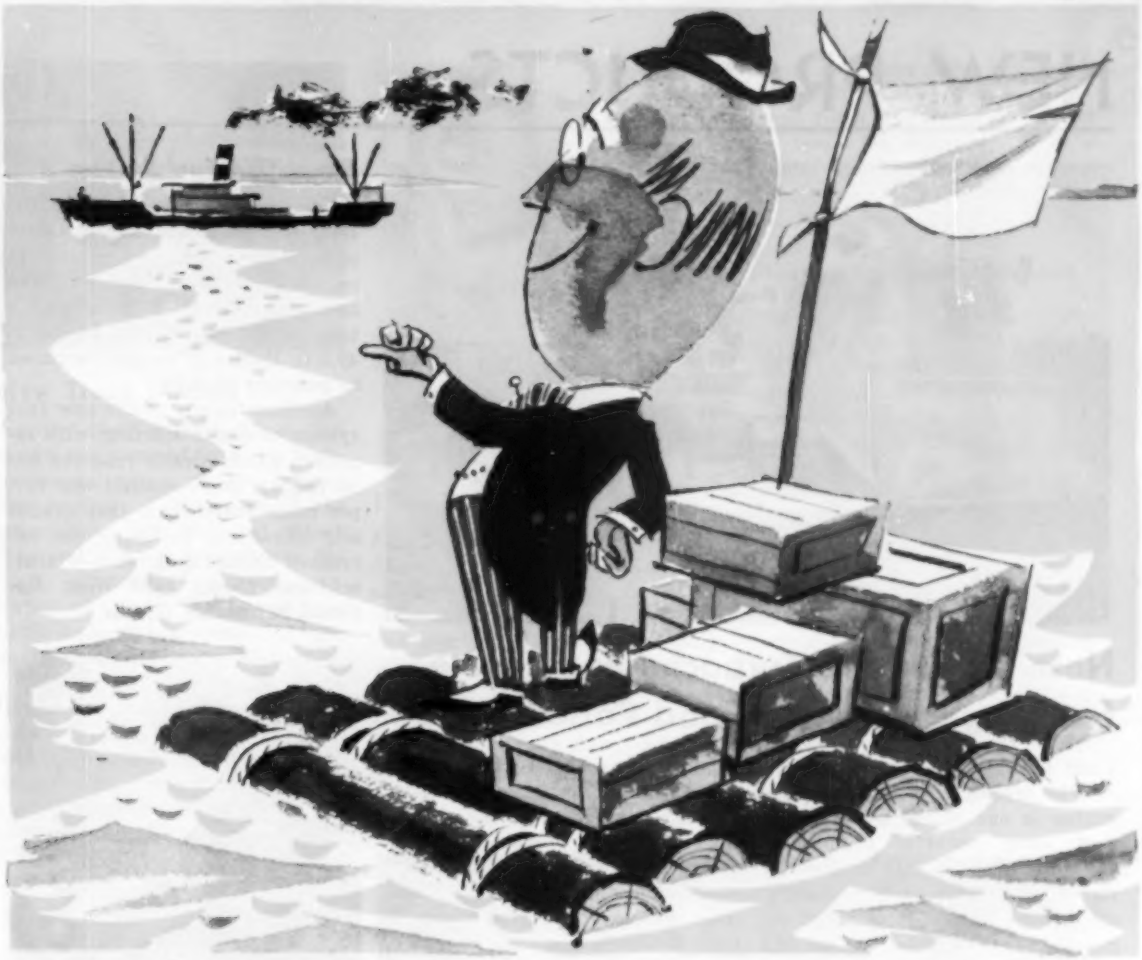
He emphasized that much work has been done by anatomists on individual and sexual variations in body structure. He noted too that industrialists had applied so little of such basic information that he wondered whether some realized that most of the things they made were to be used by people.

His views were reinforced by opinions of other speakers. Research applications described were further evidence of the psychological aspects of design.

• **Control Levers**—Experimental equipment compared pressure-operated and free-moving control levers for adjusting machine speed. The demonstration showed that pressure control greatly reduces time needed to make changes. It has had some military uses and may have industrial applications.

• **Crane-Cab Controls**—Master controllers in a crane-cab demonstration required a relatively straight movement of the operator's arm, instead of the previous rotary movement in a horizontal plane. Handle movement is the logical one in relation to crane movement. The crane follows the direction of the handle.

• **Continuous Inspection**—Another speaker stressed errors introduced by human-operator limitations. Adjusting a vernier gage to 0.001-in. accuracy was a 2-hr. task given to 18 subjects. Purpose was to check performance changes during exacting and repetitive visual work. Output stayed high, but accuracy during the second hour declined substantially.



Looking for an easier way?

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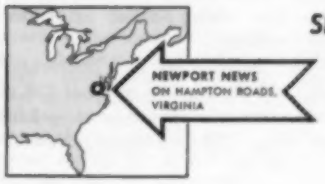


SHIP THROUGH NEWPORT NEWS, VIRGINIA... IT'S EASIER

NEW PRODUCTS

New Tractor Has Turbocharged Engine for Rugged Service, Good Performance

The new D9 230-drawbar hp. crawler tractor with turbocharged engine is one of the world's biggest, most powerful production crawlers. The D9 will be used in virtually every track-type tractor application and particularly in general construction, logging, pipelaying, mining, and quarrying. Equipped with a new six-cylinder diesel engine, every part of the tractor is designed for tough and rugged service.

Many features of the D9 were designed with operator comfort in mind. Starting engine controls are readily accessible from the adjustable sponge-rubber cushioned seat. Oil clutch, steering clutches, and brakes are power-assisted.

The tractor also will have an oil-type clutch or, optionally, a torque converter, hydraulic track adjustment, and many servicing features. All accessories are driven from a gear at the rear of the crankshaft to cut down torsional vibration. There is constant-power drive for rear-mounted equipment, such as cable controls, providing power regardless of whether the flywheel clutch is engaged or when the torque converter is operating at lowest speeds.

Safety is another feature. There are locks on both brake pedals. Pumps are mounted on the rear of the engine to provide constant power for hydraulic actuation of brake and clutch boosters. Grab irons are mounted on the rear and sides of the fuel tank for boarding the tractor. The deck has only the most essential controls. The bulldozer cable tube for the rear cable-control unit is incorporated in the right-hand main frame member. Service conveniences facilitate maintenance.—**Caterpillar Tractor Co., Peoria 8, Ill.**

High-Speed Buckets

"HS" elevator buckets are designed for handling maximum capacities of granular, free-flowing materials at high speeds. Long life is assured by the special construction features. The smooth interior permits quick, clean discharge; the low front lip is designed for maximum pick-up; and the high bucket ends minimize spillage.

Body ends are fabricated from the same gage of steel for uniform strength throughout.—**Link Belt Co., 233 Broadway, New York 7, N. Y.**

Simplified Fuel System

An entirely new fuel system designed around the Roosa-Master pump is now standard equipment on all P&H diesel engines. The new fuel system does away with a total of 131 separate parts and is 49.5 lb. lighter in weight compared to previous models.

Another feature of the new fuel system is easier starting with injection automatically retarded until engine speed reaches 500 rev. per min. Injection is then gradually advanced, matching the increased operating speeds.—**Harnischfeger Corp., 4400 West National, Milwaukee 46, Wis.**

Desk Stabilizer

An adjustable desk stabilizer designed to eliminate vibration and improve typewritten work by changing a "wobbly springboard into a firm platform" is installed by means of an automatic self-locking mechanism. Of sturdy all-metal construction, it is readily adjustable and extends from 17 to 31 in. It can be telescoped to fit into any desk drawer. It will not interfere with the typist.—**Underwood Corp., 1 Park Ave., New York 16, N. Y.**

New Truck Models

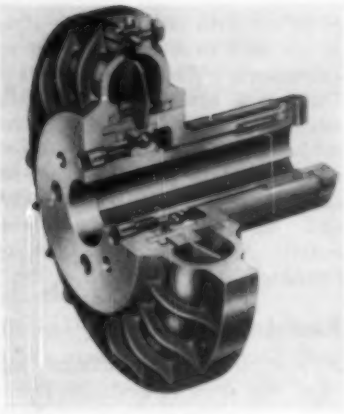
Six new truck models, the R-1700 series, are powered by a new high-torque, valve-in-head 140-hp. gasoline engine. The engine is the six-cylinder International Black Diamond 264, which delivers 234 lb.-ft. of torque at 2,000 rpm. Ratio of brake horsepower to cubic-inch displacement in the engine is 0.53.

Each of the new trucks has a four-speed standard transmission with optional fifth-speed with overdrive and fifth-speed with direct-in-fifth transmissions available.—**International Harvester Export Co., 180 No. Michigan Ave., Chicago 1, Ill.**

Deep Throat Contour Saw

New 30-in. contour saw is intended to fill the needs of job shops for a low-cost, deep-throat machine. The saws are engineered and powered for straight or curved metal sawing operations.

They are easily arranged for band filing, metal polishing, finishing and slicing of hundreds of other materials by applying the inexpensive accessories built for the machine.—**The DoALL Co., 254 No. Laurel Ave., Des Plaines, Ill.**



Industrial Power Drive

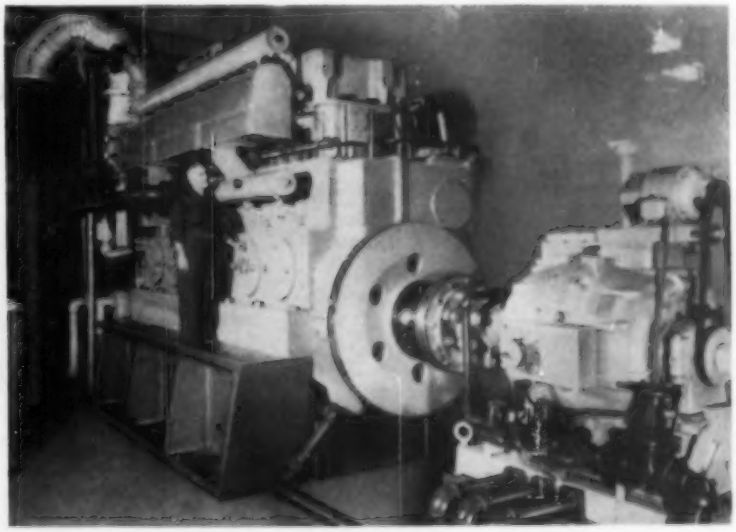
Flexidyne, described as a *dry*-fluid drive, handles difficult starting and reversing problems, gives excellent protection against shock and overload. Driven and driving equipment are thus protected.

A rotor inside the housing is free to turn concentrically. Between the two are fine steel shot, called the "flow charge," which acts like a fluid. The flow charge transmits power from housing to rotor as it is thrown out by centrifugal force and wedged between the two. No slippage occurs at normal operating speeds. Power transfer is positive—**Dodge Mfg. Co., Mishawaka, Ind.**

Plastics Molding Machine

Preplasticizing-type injection-molding machine is available ready for operation with the exception of oil and dies. It is fully hydraulic and has a 64-oz. shot capacity and a 425-ton clamping force.

Among the machine's features are: a radial-piston type motor-driven pumping unit, semi-automatic control, rapid operating speeds, adjustable injection speed, independent control of injection and clamping pressures, internally-heated plasticizing cylinder with four-zone temperature control, and a plasticizing rate of 200 lb. of polystyrene per hour.—**Watson-Stillman Co., Aldene Rr., Roselle, N. J.**



Turbo-Supercharged Power Engines

New line of 16-cylinder V-engines will develop twice as much power as present diesels of the same weight and dimensions. The new SW 14 engines have many outstanding features. Three-power arrangements permit use of the new engines as oil diesel, dual-fuel diesel, or spark-ignition gas. The manufacturer claims its new SW 14 engine to be the only low-speed, heavy-duty, high-pressure turbo-supercharged engine in the U. S. designed and built for a capacity exceeding 200-lb.-per-sq.-in. brake mean effective pressure. One of the unique features built into the new SW 14 line is interchangeability of major parts between the in-line and the V-engines, such as cylinders, heads, rods, pistons.—Worthington Corp., Harrison, N. J.

Low-Cost Radial Drill

New radial drill has its column flame-hardened to retain machine accuracy and avoid column scoring. The drill also features two-lever, direct-reading spindle-speed and feed-shift dials; nine spindle speeds; six power feeds; forced-spray lubrication of internal mechanism; and raise-lower push-buttons. The machine is powered by a 1½-hp. motor, has a 3-ft. arm, drills to the center of a 77-in.-dia. circle, and has a drilling capacity of 1½ in. in cast iron.—**Cincinnati Lathe & Tool Co., Cincinnati 9, Ohio.**

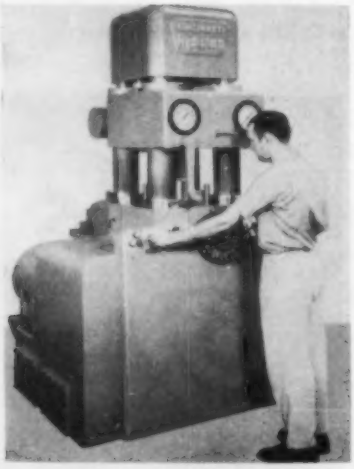
Cuts Worker Fatigue

Two devices to protect workers against high-intensity noise utilize an over-the-ear cushion formed from a soft, spongy material that effectively soaks up sound waves and keeps them from reaching the ear. The cushions were designed on the basis of extensive studies by the U.S. Air Force's laboratories.

One model is in the form of a cap available in three sizes and equipped with an adjusting strap at the back to meet individual requirements. The other model is built as a head-set that is fully adjustable for any wearer. This model is particularly recommended by the manufacturer for supervisors and others who enter and leave noisy areas.—**Mine Safety Appliances Co., 200 N. Braddock St., Pittsburgh 8, Pa.**

Rust-Inhibitor

A rust-inhibitive aluminum pigment will soon be available in the form of a paste made up of strontium chromate and powered aluminum. The new pigment will possess the outstanding rust-inhibitive properties of strontium chromate and effective hiding power, reflectivity, and protection to underlying material of aluminum pigment.—**Reynolds Metals Co., 19 E. 47th St., New York 17, N. Y.**



Small-Size Hydroform

Introduction of 8-in. Hydroform enlarges press line to six sizes—8, 12, 19, 23, 26 and 32 in. Size designation indicates maximum blank diameter, the 8-in. machine handling blanks to 8 in. with a maximum draw depth of 5 in. Operating rate is 200 cycles per hr.

The Hydroform draws sheet metal over a male punch on the bottom platen with a flexible die member stretched over a pressure chamber in the upper platen. Hydraulic oil pressure in the chamber can be accurately controlled up to 15,000 lb. per sq. in. Advantages include fewer draws required to form either simple or intricate parts, less expensive tooling, and faster tooling setup than with conventional dies.—**Cincinnati Milling Machine Co., 4701 Marburg Ave., Cincinnati 9, Ohio.**

Twin-Power Tractor

The Euclid TC-12 with 40% greater weight and 80% more power than tractors currently in use may establish a new size class of crawler tractors. These new "super tractors" will pushload rubber-tired scrapers faster and permit larger scrapers to be utilized.

An outstanding feature is the use of two 194-hp. diesels, each driving one of the tracks through separate Allison Torqmatic drives consisting of torque converter and semi-automatic transmission. This arrangement of the power train is said to provide simple operation, a smooth steady flow of power, and greater drawbar pull at faster speed.—**General Motors Overseas Operations, 1775 Broadway, New York 19, N. Y.**

New Line of Axles

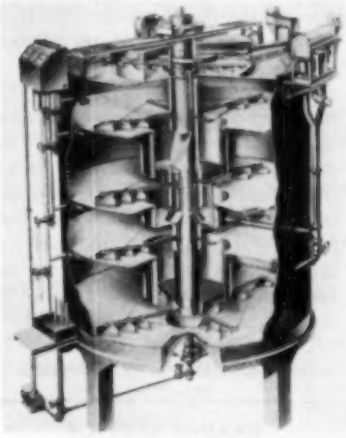
A new line of planetary drive and drive-steer axles is now available for application in heavy-duty, four-wheel drive equipment such as graders, scrapers, and other off-the-road vehicles.

Advantages claimed for the planetary drive axles include elimination of torsional wind-up in the drive shaft and surging, added operational safety, and ease of maintenance because of lighter construction.—**Clark Equipment Co., Battle Creek 73, Mich.**

Small Contour Projector

Operator training time will be held to a minimum with the new portable bench-type Kodak contour projector, model 8. The projector is designed for economical checking of small parts. It is equally adaptable for either horizontal or vertical projection gaging.

Parts to be inspected may be staged in simple holding fixtures for horizontal projection or may be placed on an easily-mounted glass stage, with the machine turned on end, for vertical projection. Six magnifications are provided, with all lenses quickly interchangeable and positively seated for the precise, rated magnification.—**Eastman Kodak Co., Rochester 4, N. Y.**



Cane-Juice Clarifier

The RapiDorr juice clarifier is a new four-compartment unit for the high-speed clarification of cane juice. It reduces processing time by 30% while producing juice of comparable clarity and sediment of equal density—when compared with the conventional equipment.

New design features, such as overflow measuring weirs, permit control of clarification to an even greater degree than possible in previous conventional machines.—**Dorr-Oliver Inc., Barry Place, Stamford, Conn.**

All-Nylon Tubeless Off-the-Road Tires

A complete line of wide-base, low-pressure tubeless off-the-road tires have been designed specifically to provide maximum flotation in soft dirt and sand and under conditions where flotation as well as traction is a major problem. Tires feature a modified traction tread and can be used on varied types of off-the-road equipment, including tractors, bulldozers, scrapers, and other earth-moving equipment.—**International B. F. Goodrich Co., 500 Main St., Akron, Ohio.**

Self-Contained Drill

New triple-duty Drillmaster is a self-contained unit designed to speed up the drilling of rock. Unit provides a wide range of hole sizes and drilling depths.

Drillmaster embodies three methods of drilling: (1) the Depth-Master or "down-the-hole" drill; (2) the Power-Master, a heavy-duty hammer drill; and (3) the Roto-Master rotary drill. Any one or all three of the drilling combinations are available to suit requirements or rock conditions.—**Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.**

NEW PRODUCT BRIEFS

Tractor-mounted Drill—Model YT earth drill, an attachment for the 50-hp. HD-5 crawler tractor, can bore holes up to 24 in. in dia. The drill, driven through tractor power take-off, is hydraulically controlled.—**Allis Chalmers Mfg. Co., Milwaukee 1, Wis.**

Measures Amplitude—A new cathode-ray oscillograph has been specially designed for making precise measurements and analyses of phenomena that take place at extremely high rates of speed.—**Allen B. Du Mont Laboratories, Inc., 350 Fifth Ave., New York, N. Y.**

Selective Filtration—Multi-Cartridge oil filters are available in ten sizes. Six different types of cartridge refills may be used interchangeably. Each cartridge is designed to do a specialized filtering job depending on type of oil, flow rate required, kind and degree of contamination, and other factors. —**Houdaille-Hershey of Indiana Inc., Lebanon, Ind.**

Low-hydrogen Electrode—Strike-easy LH-1, a new electrode, is designed to provide faster and easier operation than conventional low-hydrogen electrodes, with excellent X-ray properties of weldments. Powdered metal in the coating contributes to the weld, making possible high speeds, and helps to stabilize operation of the electrode.—**International General Electric Co., 570 Lexington Ave., New York 22, N. Y.**

High-strength Rope—A new line of wire ropes with steel cores is now available. The new rope has high resistance to wear from bending and abrasion. It will be obtainable in rope sizes ranging from ¼ to 3½ in.—**John A. Roebling's Sons Corp., 640 So. Broad St., Trenton 2, N. J.**

Rubber Stamp—A stamp, of composition rubber impregnated with a special ink, is said to give as many as 100,000 clear impressions without inking.—**Everprint Products, Inc., 224 Livingston St., Brooklyn 1, N. Y.**

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Maintenance Peg Board Provides Tight Control

Digested from Factory Managementment & Maintenance, Apr, p90—"ProducTrol" board, made by Wassel Organization Inc. (Westport, Conn.), helps schedule and control work of Jones & Laughlin Steel Corp.'s (Pittsburgh, Pa.) painting and sheet-metal maintenance crews.

The peg board gives J & L the needed flexibility while remaining simple to operate. It also has these advantages:

- **A complete, visual listing** of all active and anticipated major jobs for a whole year ahead.
- **A clearly defined** up-to-date schedule that can be easily seen and interpreted by anyone.
- **A record** of the actual performance on each job, showing actual starting date, number of men, days worked, delays or days not worked and reasons why, completion date, the summary of man-hours spent.

Chemical Etching

Digested from Aviation Week, May 2, p56—A new chemical etching process for metal parts offers savings up to 80% over conventional drilling, routing, and blanking or piercing methods. The technique was developed by Chance Vought, Inc.

The process works this way: a black and white master drawing of the part is transferred to the metal by photoengraving, metal lithographing, or silk-screen printing, using a special ink or compound. Unwanted material is then etched away by acids at approximately 0.001 in. per min. By increasing base etch temperature by 20°F., etching time can be halved, Chance Vought reports.

READER SERVICE

As a special service to our subscribers, McGraw-Hill Digest will furnish without any charge additional information about any technical development described. We will also furnish you with complete original copies of our digest articles. Tell us the name of the magazine from which the article was digested and its date and page number, as well as the month and page of the Digest. Address your letter to: The Editor, McGraw-Hill Digest, 330 West 42nd St., New York 36, N. Y., U.S.A.

MANAGEMENT REPORT

The situation: A plastics company built storage vaults for cellulose nitrate, a highly flammable material, that were designed with great care to isolate any fire, then extinguish it by flooding. Vault doors were held open temporarily for trucking by fusible links. Any fire would shut the doors, turn on the sprinklers.

The trouble: A fire started. A new employee discovered it, wedged the door open, tried to fight the fire alone. The damage was extremely heavy.

The moral: Make sure your employees are safety-conscious, make sure they know why certain procedures must be followed, discourage them from being tempted by ignorance to heroics. Don't depend on their energy and initiative to learn what they should do.—Chemical Engineering, Apr, p176

Do you ever have to serve as chairman for meetings, either in your technical or other societies? If so, here are some hints on how to improve the job you do. (1) Be prepared in advance. Have the complete program, speakers, biographies, advance copies of papers, list of guests. (2) Know your speakers before the program starts. Review the planned program with them. (3) Check the site before the session starts. Make sure that needed materials are there.

More hints: (4) Start on time. This assures that speakers get their full allotted time. (5) Keep on schedule. (6) Be brief in your opening remarks and introductions. This will set a brisk pace for your speakers to follow. (7) Help the speakers who become frightened by the microphone. Remind each speaker to stand a foot from the microphone—and keep him there.—Petroleum Processing, May, p687

If your plant is plagued with electric shock accidents, why not start an all-out drive to stop them? General Electric Co. recently did with this four-point program:

1. **Check** all electrical test equipment for design, installation, and use.
2. **Analyze** testing procedure and correct dangerous work habits.
3. **Ask supervisors** to check every employee to make sure he knows—and follows—safe operating practices.
4. **Make sure** all employees are trained in artificial respiration methods.—Factory Management and Maintenance, May, p140

How do you judge ability of industrial management? The Lima Management Club (Ohio) heard one speaker make this outline as an answer:

- **Profitability**—the ability to earn a sound return year after year.
- **Response to change**—the alertness and adaptability of management to new methods, new markets, and new quality demands.
- **Sound employee relations**—a sincere realization that the individual employee is important.
- **Recognition** of public responsibility as an honored member of the community.
- **Response** to obligations to the stockholders.—American Business, Apr, p42

What it means to be a successful technical manager was discussed at the recent Institute of Radio Engineers management sessions. These are some of the points expressed:

On the job: An effective technical manager is able to organize and direct the activities of others for greater productivity.

The manager's qualities: The typical engineer differs in at least these five qualities from the typical executive:

- The **engineer** is primarily proud of his intellectuality while the **executive** is primarily proud of his practicality.
- The **engineer** is spontaneously interested in physical things while the **executive** is spontaneously interested in people.
- The **engineer** is more thoughtful than active, introverted, while the **executive** is more active than thoughtful, extroverted.
- The **engineer** is less able to use his own emotions as drives. The **executive** can accept his own emotions and use them as drives to accomplish results with himself and others.
- The **engineer** may be limited in both fluency and clarity of verbal expression while the **executive** must be superior at both points and must be effective in verbal communications.—Electronics, May, p24

National Machine Tool Show (Chicago—September 6 to 17) will have 166 exhibitors displaying their equipment in the International Amphitheatre. The U. S. government lists 441 distinct types of machine tools, and practically all of these types will be shown. Visitors will find particularly impressive the amazing progress made in the last few years in the development of automatic control.

Production Engineering Show will be held at the Navy Pier at the same time. On display will be mechanisms, equipment, and instruments that contribute to greater efficiency for all types of manufacturing, not metalworking alone. Among them: machine-tool accessories, electronic devices, gages, conveyors, brakes, clutches, dies, and jigs.

Metalworking Machinery & Equipment Exposition will run concurrently at the Chicago Coliseum.

NEW FREE CATALOGS

V-belt Drives—Book No. V-1400-E2F presents a scientific and simplified method for rating V-belts. Table on drive selections contains nearly every possible stock sheave combination.—Worthington Corp., Harrison, N. J.

Sound Projectors—Booklet V3-22 describes the new Kodascope Pageant series of 16-mm. sound and silent projectors and their many possible uses under varying conditions of audio-visual operation.—Eastman Kodak Co., Rochester 4, N. Y.

Precision Cylindrical Grinders—The Landis 10-in. and 14-in. plain hydraulic cylindrical grinding machines, for high-production grinding as well as for short runs, are described in catalog B-54.—Landis Tool Co., Waynesboro, Pa.

Radial Power Saws—Booklet SP-59-54 outlines the many ways in which DeWalt radial power saws reduce costs and increase profits for the user.—American Machine & Foundry Co., Intl. Div., 261 Madison Ave., New York 16, N. Y.

Starters—Motors and air brake starters for 2,200- to 5,000-volt squirrel-cage, wound-rotor and synchronous motors are described and illustrated in bulletins 1062 and 1060.—The Electric Controller & Mfg. Co., 2662 E. 79th St., Cleveland 4, Ohio.

Concrete-block Machines—Form 103 contains complete information on Lith-I-Block machines for fully-automatic, big-volume production of high-quality block at lowest cost.—Lith-I-Block Co., Holland, Mich.

Railway-car Refrigeration—The Diesel-Icer mechanical refrigeration system, which provides automatic controlled cooling and heating for railway refrigerator cars, is described in bulletin 1667.—Waukesha Motor Co., Waukesha, Wis.

Canadian Commercial Enterprises—Memorandum (available in either English or German) furnishes a general outline of taxation and other matters that should be of interest to anyone considering the establishment of a commercial enterprise in Canada.—Bank of Nova Scotia, Toronto, Canada.

Boiler Refractories—Bulletin R-36 provides operators of stationary and marine boilers and authoritative guide for selecting the most efficient and economical refractories for their boilers.—Babcock & Wilcox Co., 161 E. 42nd St., New York 17, N. Y.

Pump-turbines—Detailed information on pump-turbines and generator-motor units for reversible pump-turbines is given in bulletin 02R8245.—Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Railroad Products—Bulletin H-105, available in English or Spanish, provides general information on brake shoes, car wheels, journal bearings, and trackwork.—American Brake Shoe Co., 230 Park Ave., New York 17, N. Y.

Vibrating Screens—A complete line of vibrating screens for all medium- and heavy-duty screening operations is covered in book 2554.—Link Belt Co., 233 Broadway, New York 7, N. Y.

Magnetic Amplifiers—Booklet 52-600 explains the basic theory under-lying Magamp magnetic-amplifier operation, gives information necessary for application, and describes operating characteristics.—Westinghouse Electric Intl. Corp., 40 Wall St., New York 5, N. Y.

Valves—Multistage quantity-control valves are described and illustrated in bulletin OG 454. Valves provide shock-free, preset shut-off of flows ranging from 60 to 800 gal. per min.—Rockwell Mfg. Co., 400 Lexington Ave., Pittsburgh 8, Pa.

Pipe Fittings—New 150-lb. stainless-steel pipe fittings are fully described in bulletin S-3-55. Stainless-steel fittings are suitable for applications in chemical plants, refrigeration service, food and other process piping.—Watson-Stillman Co., Fittings Div., 150 Aldene Rd., Roselle, N. J.

Engines—Catalog E-9 illustrates and describes the 150- to 410-hp. Le Roi L3000, H2000, and F1500 engines. Catalog contains cutaway views and photographs to show advanced features.—Le Roi Div., Westinghouse Air Brake Co., Milwaukee 14, Wis.

Air Filter—Bulletin contains detailed information on the Cambridge Aerosolve filter, designed for high-efficiency air filtering in commercial and industrial ventilating air-conditioning systems.—Cambridge Filter Corp., 738 Erie Blvd. East, Syracuse 1, N. Y.

Welding Stainless Steels—Complete information on the welding, brazing, soldering, and hot cutting of Enduro stainless steels is given in catalog ADV 585R.—Republic Steel Corp., Export Dept., 405 Lexington Ave., New York 17, N. Y.

Silicone Grease—Detailed information on Dow Corning 41 Grease, designed for use in anti-friction bearings operating at low speeds and high temperatures, is given in bulletin 6-202.—Dow Corning Corp., Midland, Mich.

Hydroforming—A new method of deep drawing simple or intricate shapes in all kinds of sheet metal is completely described in booklet M-1759-3.—Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

Industrial Solenoids—Bulletin GEA-6215 describes the complete line of strongbox industrial solenoids. Publication contains information on product features, laboratory tests, and general application rules.—Intl. General Electric Co., 570 Lexington Ave., New York 22, N. Y.

Crane and Hoist Electrification—Bulletin 44 describes the advantages of the Feedrail System of enclosed trolley busway electrification. Bulletin pictures the application of Feedrail systems in numerous applications.—Feedrail Corp., 125 Barclay St., New York 7, N. Y.

Fluidization—Bulletin 7502 describes the operation, advantages, theory, and typical applications of the FluoSolids system, a new method of drying, sizing, or heat treating minus ¼-in. solids under closely controlled temperatures.—Dorr-Oliver Inc., Stamford, Conn.

Proportioning System—The Select-O-Weigh automatic proportioning system, which permits remote dialing of individual ingredient weights, is pictured and described in bulletin 0351.—Richard Scale Co., Van Houten Ave., Clifton, N. J.

Cellular-glass Insulation—Bulletin FB 102 contains information on the specific advantages of FOAMGLAS cellular-glass insulation in thin-wall and sandwich-panel construction.—Pittsburgh Corning Corp., 1 Gateway Center, Pittsburgh 22, Pa.

Please write directly . . .

. . . to the manufacturers for the free literature announced on this page. Tell them definitely which catalog you want—specify the catalog number or its name when either one is given. And mention that you saw the offer in the McGRAW-HILL DIGEST.

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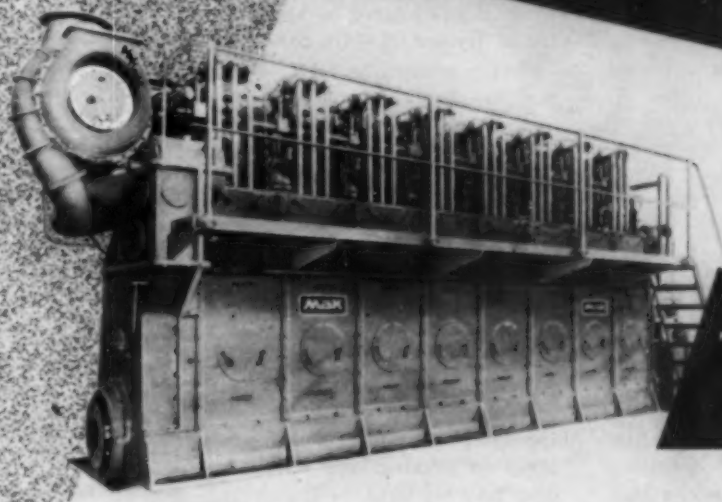

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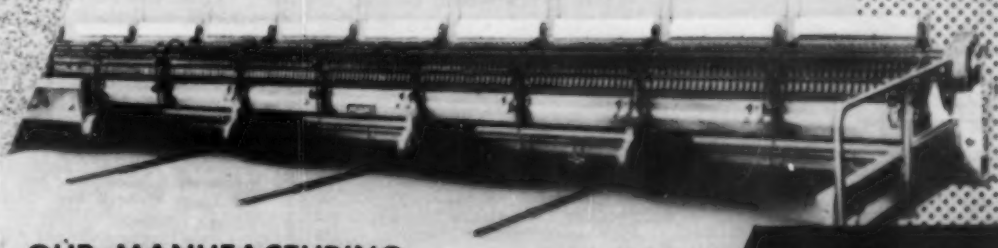

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Information Offered

If you need specific information on any subject, check through this index of literature and information being offered in the advertisements in this issue. Please write directly to the advertiser.

Advantages of shipping through Newport News, Virginia, are given in illustrated booklet. Chesapeake & Ohio Railway.—p47.

Aluminum rods, tubing, bars and angles enable you to manufacture beautiful modern furniture at amazing savings in materials and production cost. Reynolds Metals Co.—p6.

Bookkeeping problems can be solved with a Burroughs multiple-purpose typewriter-accounting machine. Burroughs Corp.—3rd Cover.

CRF Book contains explanatory text on the machines, the art, end uses and economics of cold roll forming. Yoder Co.—2nd Cover.

Cummins diesels give you the big plus . . . more profit. Year after year, more truckers agree that Cummins is the best engine money can buy. Cummins Diesel Export Co.—p44, 45.

Film-type resistors have unusually high electrical stability, ability to withstand high operating temperatures, and superior high frequency characteristics. Corning Glass Works.—p4.

Hack saw blades are available in all types, sizes, and pitches for hand or power cutting of metals. Clemson Bros.—p30.

International business transactions are handled promptly and economically at the Bankers Trust Co.—p43.

Market Pointers—a highlight report for investors residing outside the U.S.—contains major articles, graphic charts, security facts, figures, and forecasts. Francis I. du Pont & Co.—p35.

New lift truck, Model RC-150, has exceptional stability and maneuverability, plus advanced operating and engineering features never before offered by any lift truck. Hyster Co.—4th cover.

New motor scraper, Model TS-360, can load 20 cu. yd. of earth in less than 2 min. It transports its load at speeds up to 30 kmph. (22.5 mph), and unloads in as little as 15 sec. Allis-Chalmers Mfg. Co.—p1.

Nordberg machinery profitably serves basic industries. Nordberg Manufacturing Co.—p25.

Paints made with Dow Latex are easy to apply, fast drying, and odorless. Dow Chemical International Ltd.—p46.

Shipping by air is fast, clean, and saves on packing. Air Express International Corp.—p28.

Universal Jeep—the world's most useful four-wheel drive vehicle. Willys-Overland Export Corp.—p30, 31.

Where performance counts, W&T equipment is chosen because of its dependability and accuracy. Wallace & Tiernan Inc.—p29

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Electrical Merchandising
Electrical West
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